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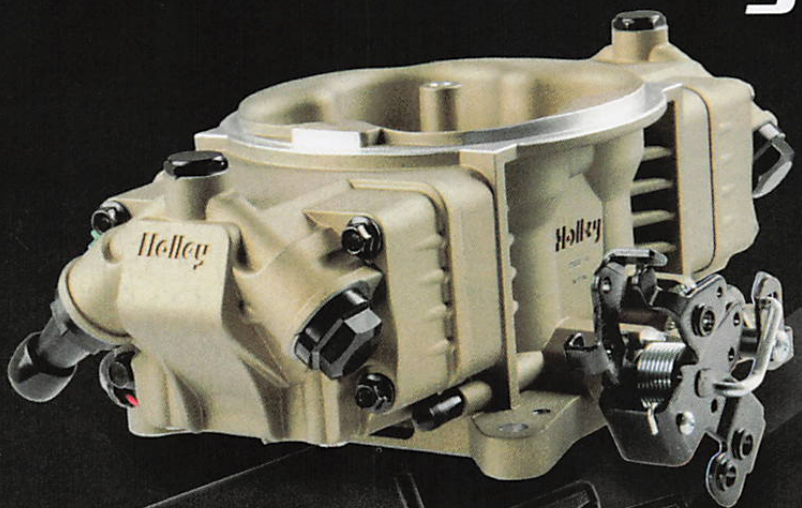

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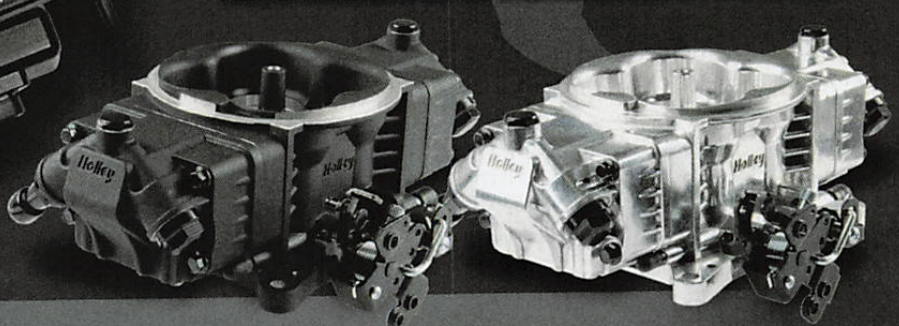

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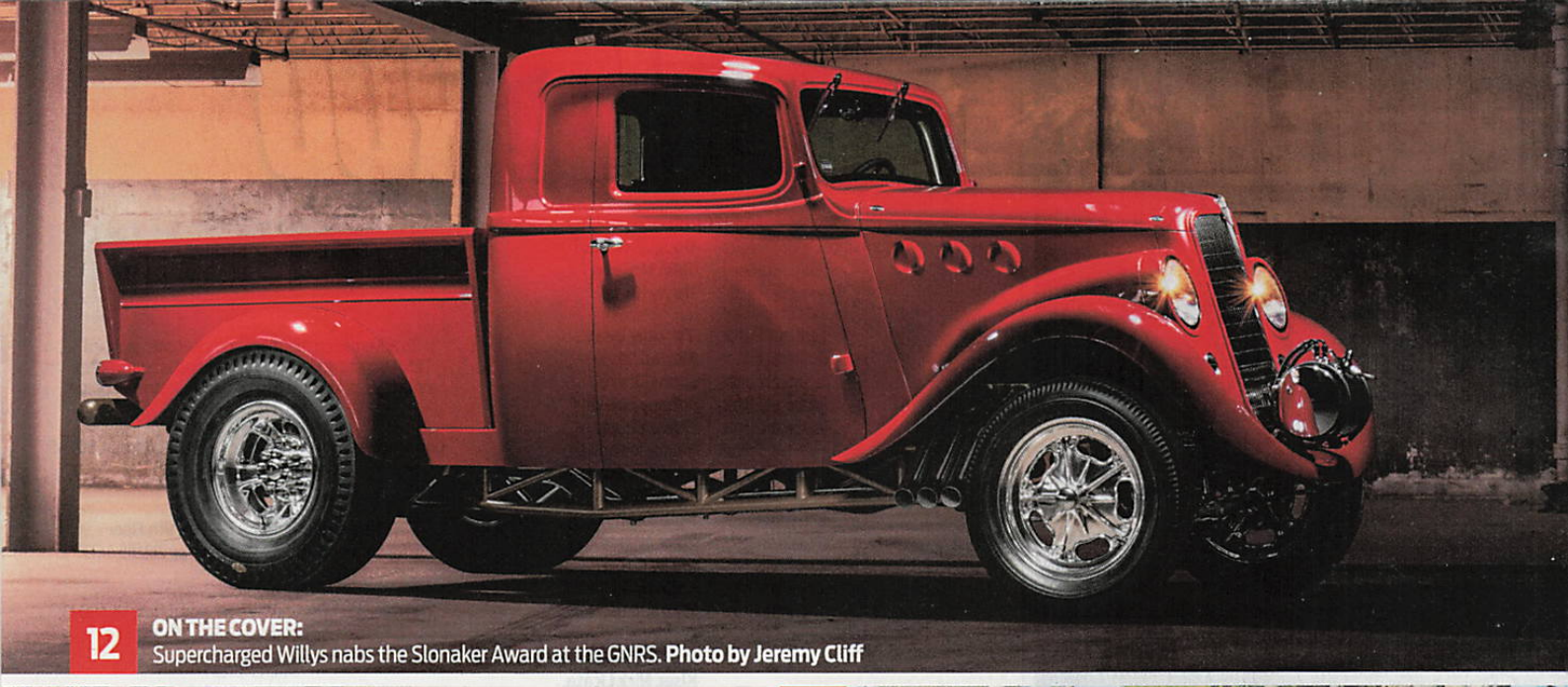

12 **ON THE COVER:**
Supercharged Willys nabs the Slonaker Award at the GNRS. **Photo by Jeremy Cliff**

20

26

Contents

06 Starting Line with John McGann
08 Where It All Began
10 HOT ROD 20, 40, and 60 Years Ago
12 **'36 Willys Delivers a Win**
20 **'63 Chevy II: From Rust Bucket to DEFCON3**
26 **'78 Pro Street Mercury Zephyr! Wait, what?**
32 '55 Chevy Week to Wicked Build
40 Mom's Hot Rodded '55 Pontiac Chieftain
44 **On Scene: Quarantine Car Cruise**
50 Lokar/Street Rodder Road Tour '34 Ford, Part 2
56 Quick Tech With Marlan Davis
58 Reader's Tech Q&A
66 Ken Duttweiler's 3,200HP Chevy Big-Block
82 In the Words of Freiburger...

44

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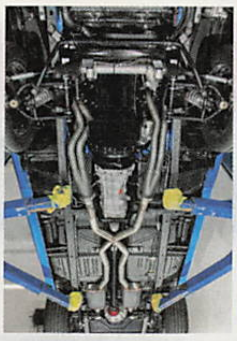
Ken Maisano's Hemi-swapped 1971 Duster was featured in the May 2017 issue of Car Craft.



Photos by Wes Allison & Jesse Kiser

Contemplating the Gen III Hemi Swap

I received a press release a few days ago that sparked an interesting line of thought. Holley recently announced a new line of products for Gen III Hemi swaps into older vehicles, namely D100/D150 pickups and 1966 to 1972 B–Body cars. The products include engine and transmission-mount adapters, headers, and exhaust and fuel systems. These parts are in addition to their various stand-alone engine management systems that can control the engine, should you wish to keep it running on EFI.

By John McGann

Editor-in-Chief

@john.mcgann

A friend who works at Holley says the company is going "all in" on the Gen III Hemi-swap stuff, so expect a lot more parts to be rolling out of Bowling Green, Kentucky, soon. That got me thinking—with the backing of Holley and their massive catalog of parts, will the Gen III Hemi swap become as ubiquitous as the LS engine swap? If so, is that a good thing?

I think the answer to the second question is an unqualified yes, while the first warrants a slightly less enthusiastic "probably". I've been around long enough to remember the first LS engine swaps by the pioneering souls who took on the challenge of figuring out clearance issues and adaptability. At *Car Craft* at the time, Tech Editor Jeff Smith led the charge, producing interchange and compatibility articles and engine tests at Westech. Companies like Muscle Rods were early adaptors and developed motor mounts and oil pans to fit most GM chassis, but I think it's safe to say that once Holley jumped into the game, the movement exploded. Yes, the groundswell had already been there, and it's likely that, if Holley had not invested in a comprehensive line of LS engine-swap components, another company likely would have. But Holley did, and with their deep parts catalog and R&D capabilities, they have become a one-stop-shop for customers looking to drop an LS engine into just about any GM car made since the '40s, and more than a few Fords and import cars.

That kind of cottage industry support has also existed for the Gen III Hemi, with companies like Bouchillon Performance Industries and Arrington Performance providing adaptor and swap parts as well as excellent tech info. We've also featured the efforts of our favorite junkyard/high-end build shop, Cleveland Power & Performance, an outfit that sells lots of Hemi drivetrains on a pallet and built the body-swapped 1969 Charger "Reverence" that debuted at the 2018 SEMA Show. Still, it sometimes takes a heavyweight in the industry to push a trend into the mainstream.

Interestingly enough, with any mainstream adaptation of a trend, backlash usually develops, and there's plenty of disdain for the LS swap these days. LS engines are in practically every car you see at the SEMA show, in hundreds (if not thousands) of web and magazine articles, and all over the Power Tour. Have an old Cadillac that needs an engine rebuild? Throw that 472 boat anchor away and drop in a 5.3! Many people would say that doing so ruins that old Caddy. I have a less harsh opinion, but I must admit I find it refreshing to look under a hood and not see an LS engine there. So, if the Gen III Hemi swap takes off, will it do so in such a way that people will be sick of them? I don't think so—at least not to the extent of the LS. People have been putting Hemi engines into all kinds of cars for decades, and it almost universally elevates the status of the car. I think the cachet of the 331/426 Hemi spills over into the Gen III version of the engine, as well. It may not have the presence of a 426 Hemi, with its big, wrinkle-black valve covers, but it's still a Hemi, and Dodge did their marketing well by keeping that mystique alive. It also helps that the current Hemi is pretty great. It makes lots of power and is just as compact as the LS, so theoretically it could fit in the same places.

So far in my career, I've steadfastly avoided putting an LS engine into any car I've ever owned. Of all of them, however, my 1993 GMC would benefit the most from an infusion of the mighty LS engine—but I always end up wrinkling my nose after giving the idea some thought. Still, should a kit come along that lets someone drop a Hemi into a GMT400 pickup, well I kinda like that idea.

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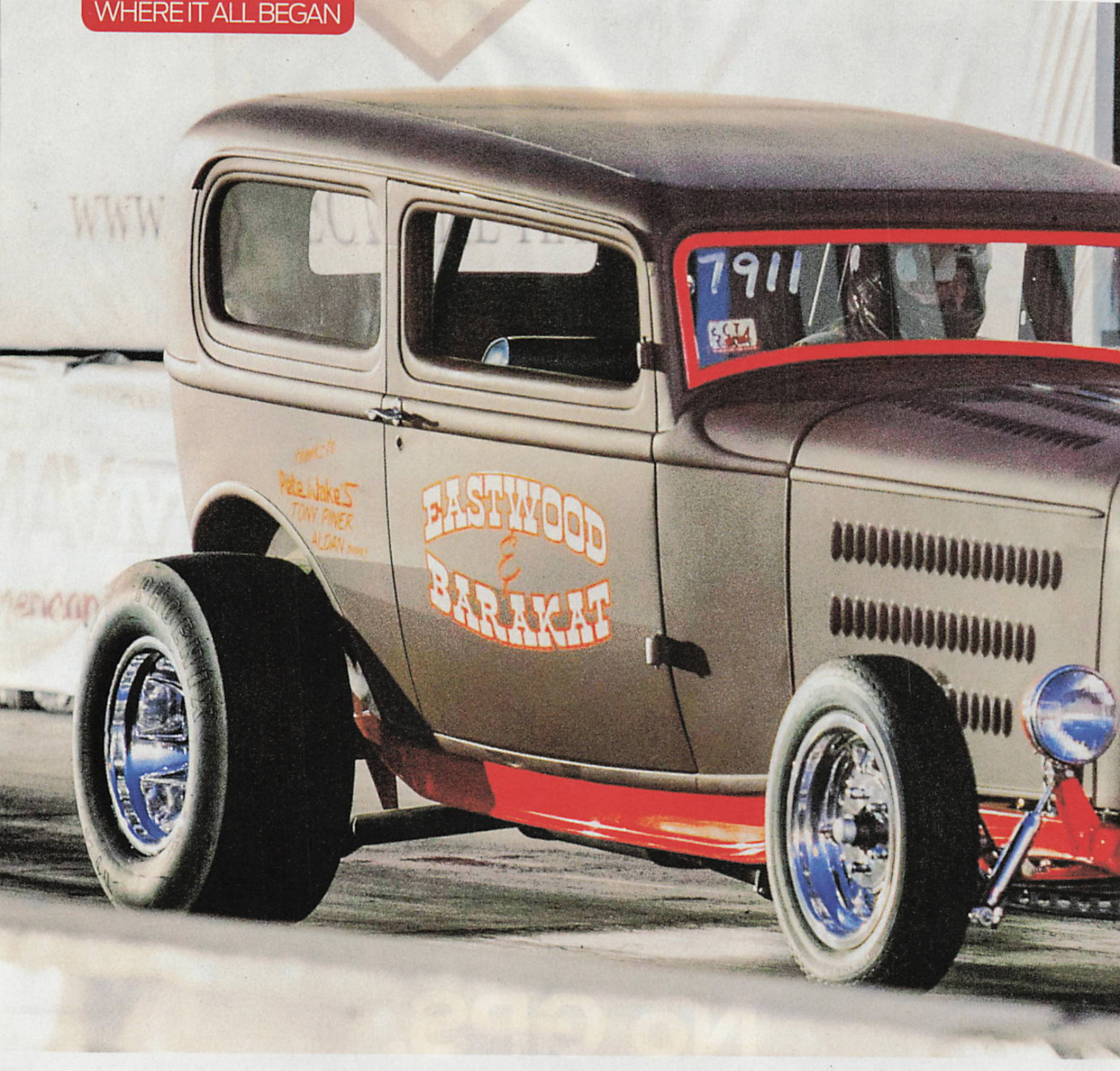


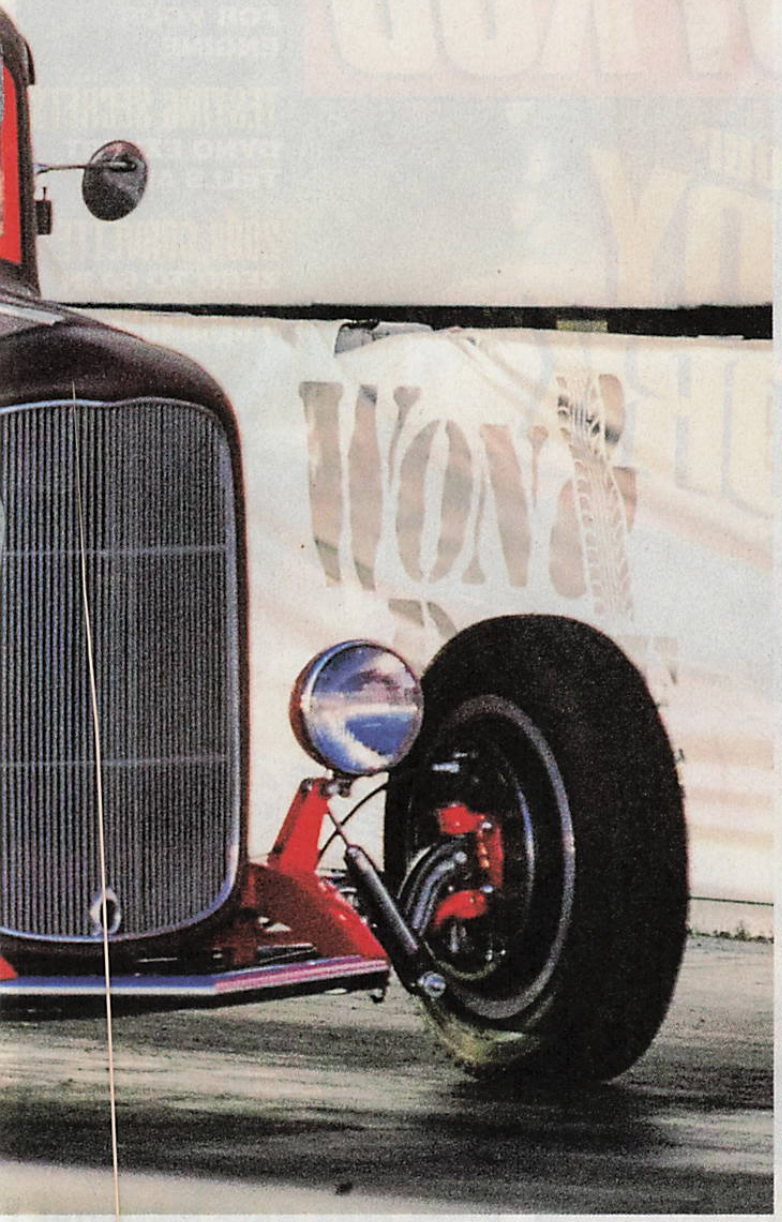
Hot Rod's First Primered Cover Car

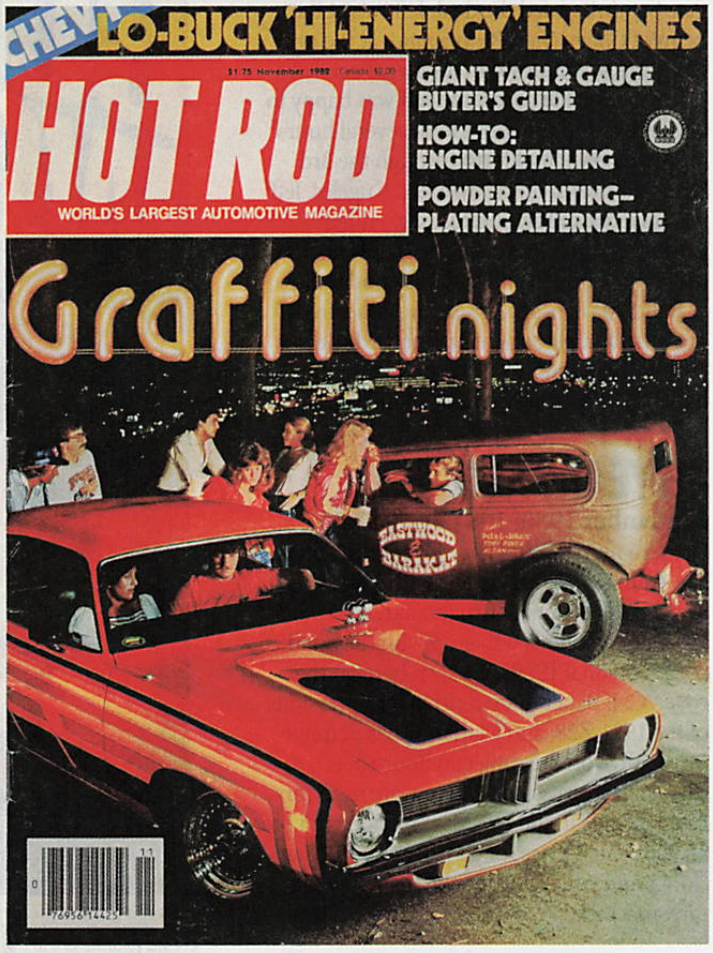
It was a bold move to put a primered car on the cover of HOT ROD in 1982. That prime piece of car magazine real estate was supposed to be reserved for the hobby's brightest, most pristine stars. Cars with nice paint, anyway—like a 1972 'Cuda with a retina-sizzling color combination. But check out the other car on HRM's cover from November 1982. There it is in the back—the Eastwood & Barakat 1932 Ford sedan, sucking up light with its flat red oxide primer finish. The main cover blurb says "Graffiti Nights," but it could have said "Primered Low-Dollar Deuce Gets More Attention Than Wildly Painted Mopar."

To be fair, those people in the picture are models, posing the way the photographer told them to. And Allen Owens' 'Cuda deserved its prominent spot on the cover. The 'Cuda was stunning, but the Eastwood & Barakat sedan was historic, and not just because it was the first primered hot rod to earn a spot on an HRM cover.

The car wasn't meant to be historic, and Pete Eastwood and Rick Barakat might have been surprised when it became that. Their only intention was to build a fast hot rod, and to build it quick and cheap. "Built from a pile of parts scrounged from both P-Wood and Bearcat's garages" is how the immortal Gray Baskerville described it in his feature story. "The body is, at best, a pile of rust. It's piles of fun to drive. And when you pile in the front seat, the cacophony generated from unfettered exhaust headers mixed with rattling tin and quivering quarter panels is strong enough to set off Cal Tech's seismograph. But it's bitchin'!"

Baskerville was with Pete Eastwood and Rick Barakat for the





HOT ROD Archive

HOT ROD track test at Orange County International Raceway. In street dress, the sedan ran a quarter-mile dragstrip elapsed time of 12.11 seconds at 113.92 miles per hour. With the mufflers removed and the quick-release headlights detached, it ran 11.59 at 117 49 mph.

The body was eventually sold and turned into a beautiful rod with a few more refined elements, such as paint. The chassis was kept for a short-lived roadster project. The car that appeared on HOT ROD's cover in 1982 did become historic, however. In 2006, on the eve of the 75th anniversary of the 1932 Ford, the Eastwood & Barakat sedan was included on the famous list of "The 75 Most Significant '32 Ford Hot Rods Of All Time."

A few years later, Bill Paul of Highland, Illinois, built a tribute version of the E&B sedan that was featured in *Street Rodder* magazine. In 2012, Eastwood and Barakat began building a near replica of the sedan they had first built 30 years before. It turned out great and made its debut at HOT ROD's 65th anniversary homecoming at the Pomona Fairplex. The color photographs here are of the newer car.

HOT ROD editor Leonard Emanuelson earned proper respect for putting the E&B Deuce on the cover of HOT ROD back in 1982. He also devoted that issue's editorial column to the car. "The Eastwood & Barakat sedan represents to me what hot rodding was all about in the beginning." Hot rods had become "ultrasophisticated," he wrote, "but somewhere in this transition we have lost the savagery, the rawness that makes the hair on your arms stand up when a rod drives by. The Eastwood & Barakat sedan brings those emotions back—it's more animal than car." **›Tim Bernsau**

The HOT ROD Archives

20 YEARS AGO

September 2000: 156 pages, $3.99

As obvious as the blazing yellow headline on the cover, bodywork was the theme back in 2000, and if that wasn't enough, Jeff Smith's 1965 El Camino, sporting flames by Pete Santini, sealed the deal. Jeff was at the helm of *Chevy High Performance* at the time when HRM editor Ro McGonegal needed a "nice" car for the cover, and Jeff was happy to oblige. Jeff said the shoot took several hours of driving back and forth through the 3rd Street Tunnel in downtown Los Angeles. Jeff still owns this ElCo and recently added Edelbrock's Pro-Flow 4 to the small-block under the hood. It still looks as good today as it did 20 years ago. Inside the issue, front sheetmetal replacement on Terry McGean's 1967 Camaro and some rust repair to the hood of Jeff Koch's Mercury Montego.

40 YEARS AGO

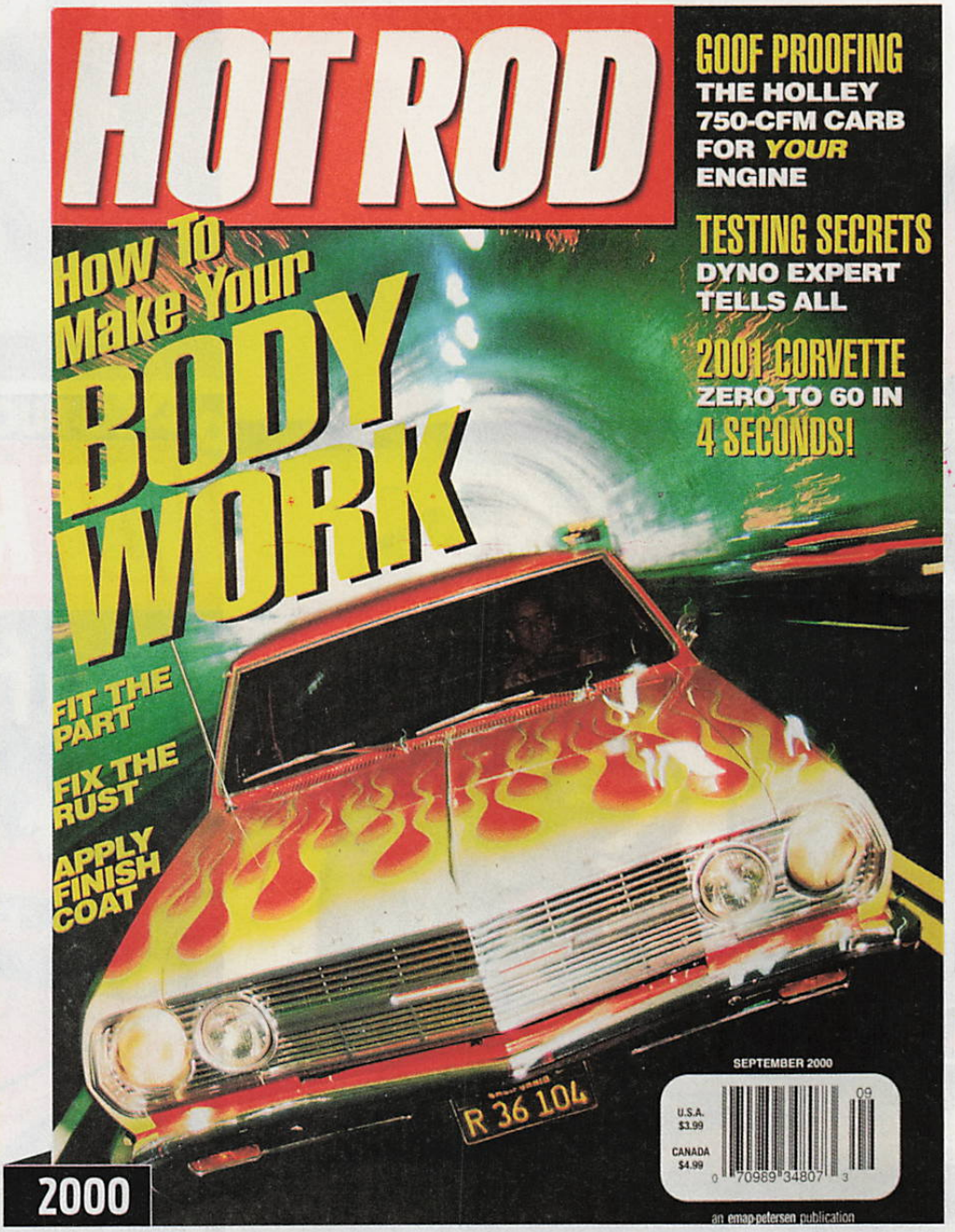
September 1980: 100 pages, $1.50

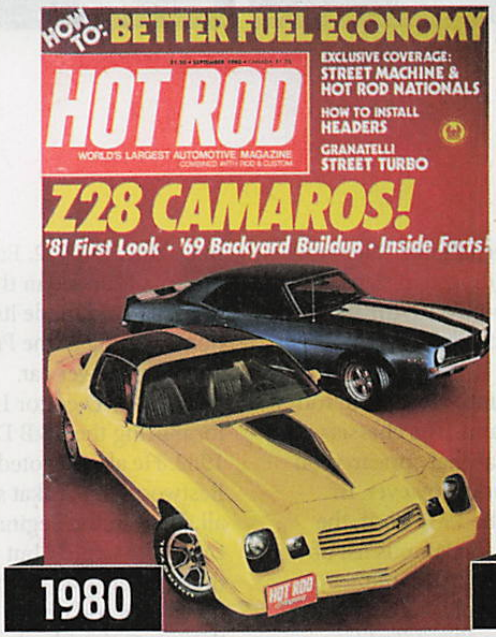
Camaro nerds would have loved this issue! The Camaro section begins with a fact sheet of the Z28 written by Bruce Caldwell. Staffer Cam Benty followed that up with the build of his personal 1969 Z28, seen here on the cover. C. J. Baker offered driving impressions of the 1981 Z28, and Marlan Davis penned a deep dive on the subject of four-speed manual transmissions. There were used cars listed for sale in the HR Mart section, and the $5,000 selling price for a 1970 Boss 302 that "looks and runs good" makes us wish for a time machine.

60 YEARS AGO

September 1960: 130 pages, 35¢

Tech Editor Ray Brock provided coverage of the Pikes Peak International Hill Climb, and the list of competitors included Bobby, Al, and Louis Unser; Ak Miller; Slim Roberts; and Roger Ward. Beautiful weather dominated the practice sessions, but race day saw ice storms and treacherous conditions. Nevertheless, the Unsers beat out the competition, with Bobby and Al securing first and second place in the Championship class and brother Louis winning the Stock class. Brock summed the event up by saying, "The thing we personally like best about the Pikes Peak Hill Climb . . . is that almost without exception, the people involved are not so interested in how much money or glory they win; they are a friendly bunch who like to have fun."

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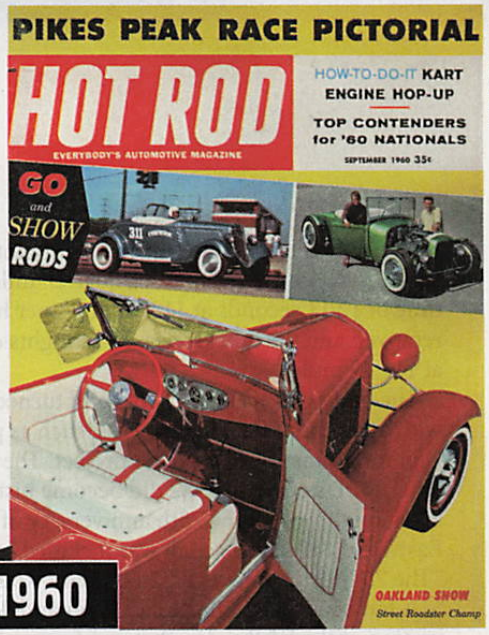

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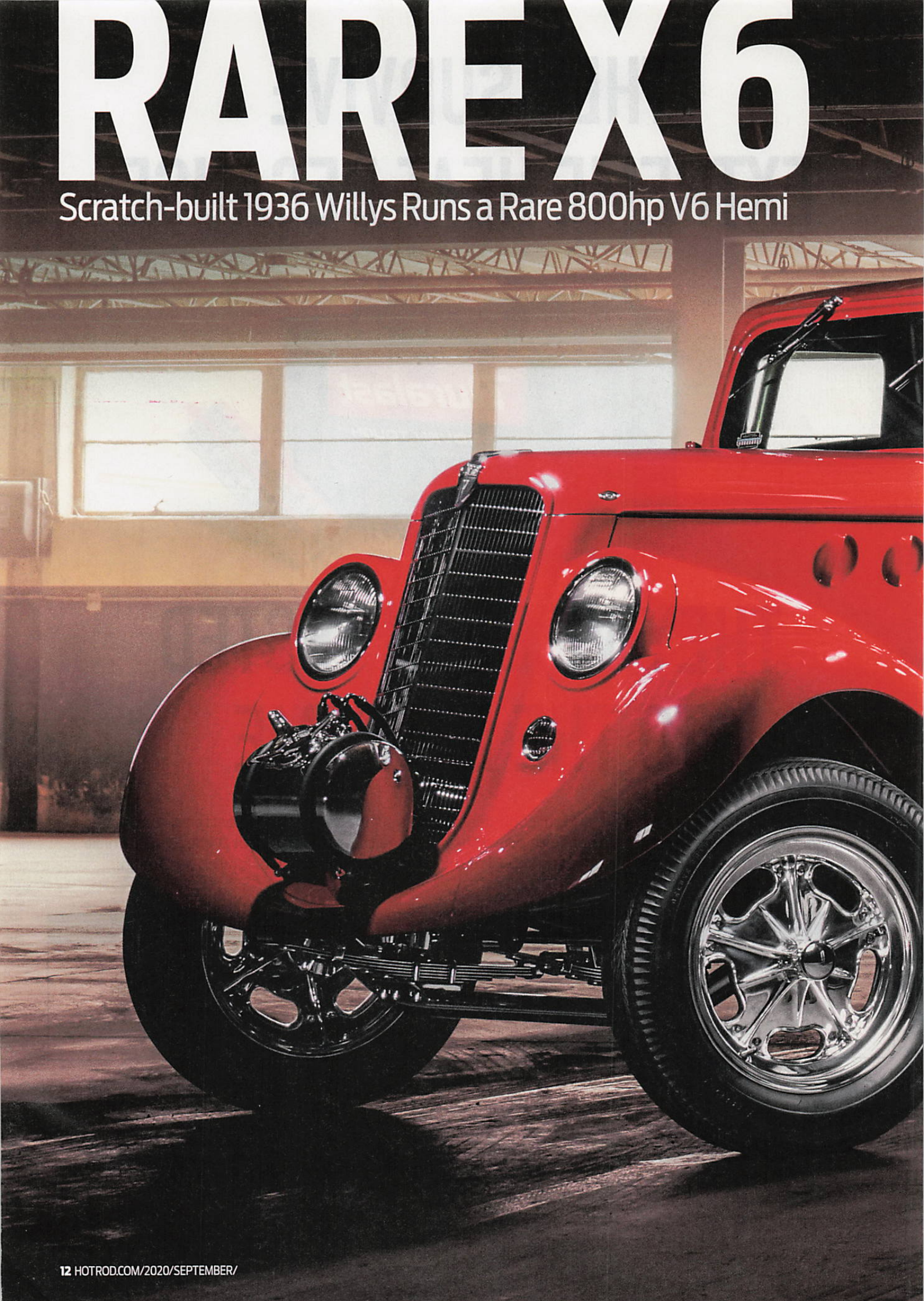

Tim Bernsau Jeremy Cliff

RARE X 6

The big news at the Grand National Roadster Show (GNRS) in January was the revamped Slonaker Award. Named for the man who established the GNRS back in 1949, the Al Slonaker Memorial Award has been presented to the professionally judged best non-roadster at the GNRS ever since 1974. Previously, this prestigious award hasn't received as much attention as the America's Most Beautiful Roadster (AMBR) award, but with a new trophy, new sponsor, and a big cash prize, that's changing.

Like the AMBR award, the Slonaker Award involves a regular-sized trophy presented to the winner, and a larger perpetual award that will feature the names of all winners. Automotive Racing Products is the new sponsor of AMBR and the Slonaker Award. Both awards now include a prize purse of $12,500.

The Willy Wins

The first vehicle to claim the new trophy is this extraordinary 1936 Willys pickup, owned by Ron and Vicki Ernsberger from Napoleon, Ohio. The truck was built by Brian Limberg and the team at The Tin Man's Garage in Sycamore, Illinois.

Ron has been immersed in hot rodding since he was a grade school kid mowing lawns to earn enough money for the newest issues of HOT ROD, *Car Craft*, and *Rod & Custom*. Reading hot rod

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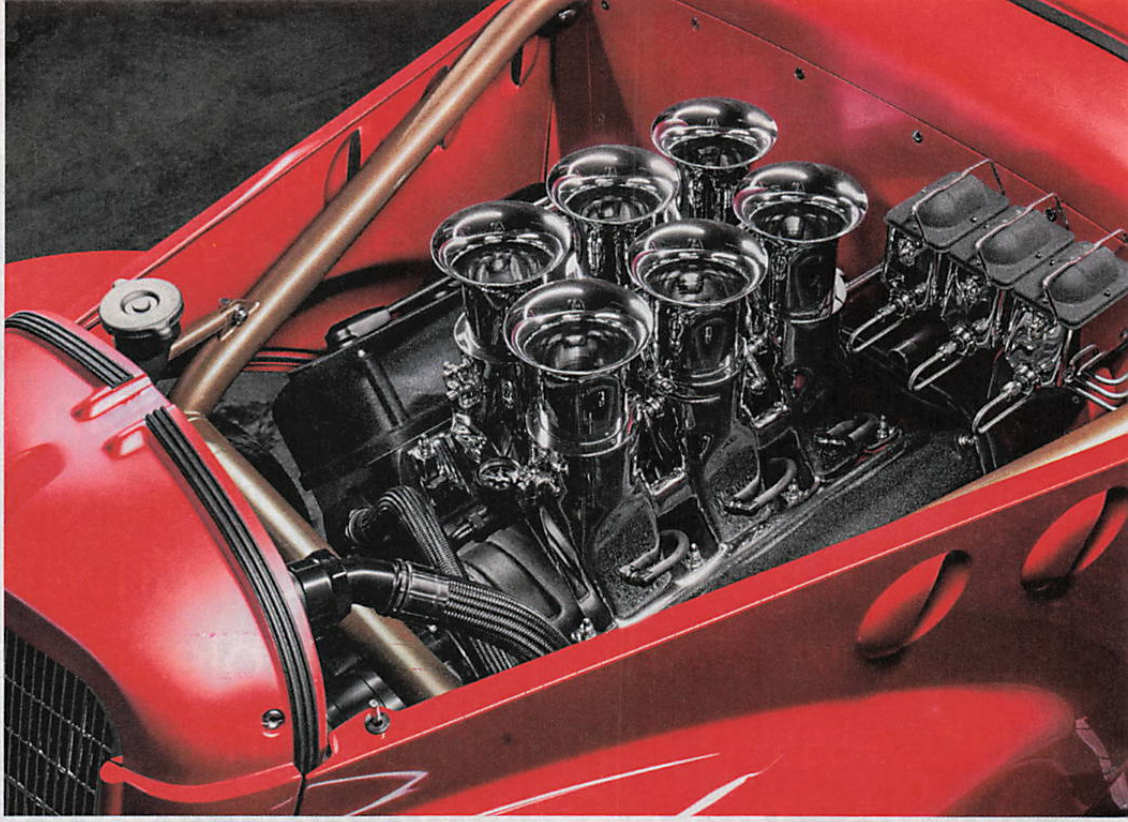
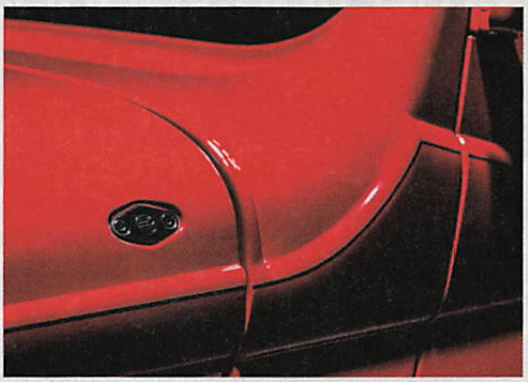
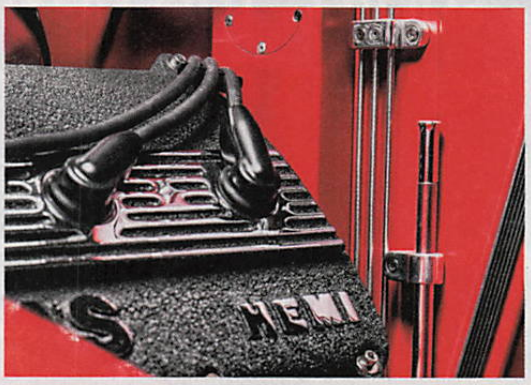
mags evolved into racing hot rods—and Ron has owned and raced a few. He drove his 1949 Hudson at Bonneville, earning a spot in the 150 MPH Club. His 1938 Willys pickup (one of many Willys in his corral) has raced at the historic Famoso Raceway in Bakersfield, California. He bought the 1936 Model 77 truck in 2002 from Bill Fowler, another lifelong rodder and gasser aficionado out of Southern California. Ron says the pickup started out as a U.S. Post Office delivery truck—but fate had more exciting plans for it. Once Ron got the truck back to Ohio, he called Brian Limberg at The Tin Man's Garage.

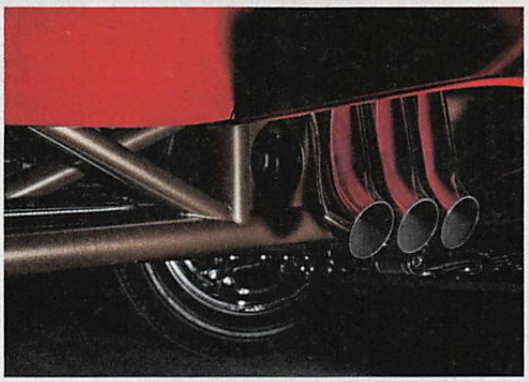
"I bought a 1941 Wilys pickup from Brian that a customer of his had given up on," Ron told us. "It is a very impressive work of art, so I wanted Brian to do the restoration on this one, as well." According to Ron, the project was envisioned as a "one-off example of a great traditional hot rod truck, only in an up-to-date format."

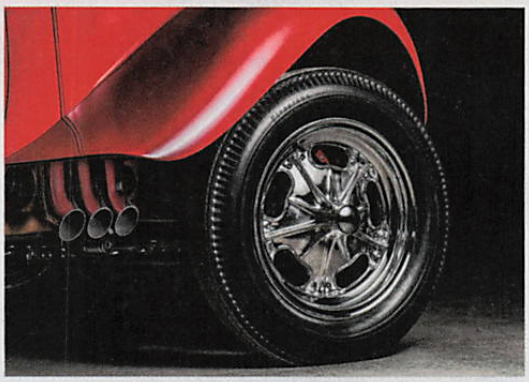
When the truck was delivered to Tin Man's Garage, there wasn't much about it to support Ron's optimistic vision. "The truck was in terrible condition," Brian remembers. "It was built on a mail-truck chassis with right-hand drive. It was completely hacked together with a torch and arc welder, with random pieces of metal welded everywhere for brackets. We scrapped the entire chassis."







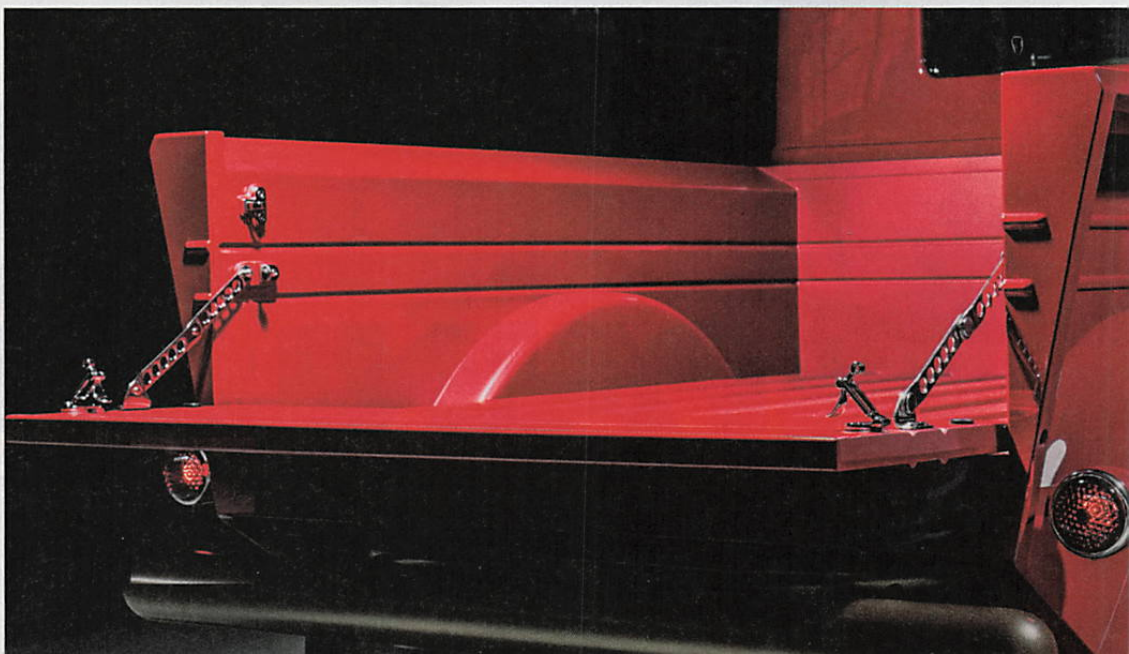




All-New Chassis

"The design concept for the chassis was to scale everything up to keep the proportions looking correct with all the components," Brian explained. The custom frame is constructed of 0.083-inch chromoly tube. "All the bracketry was designed with a minimalist approach to keep it all looking low-key, yet very strong."

Wheel and tire choice evokes '60s-era drag cars. The spindle-mount 16-inch Halibrand magnesium wheels in front roll on



skinny bias-ply Firestones. At the rear, Hurst pie crust cheater slicks on 16x12 Halibrands pack the fenders.

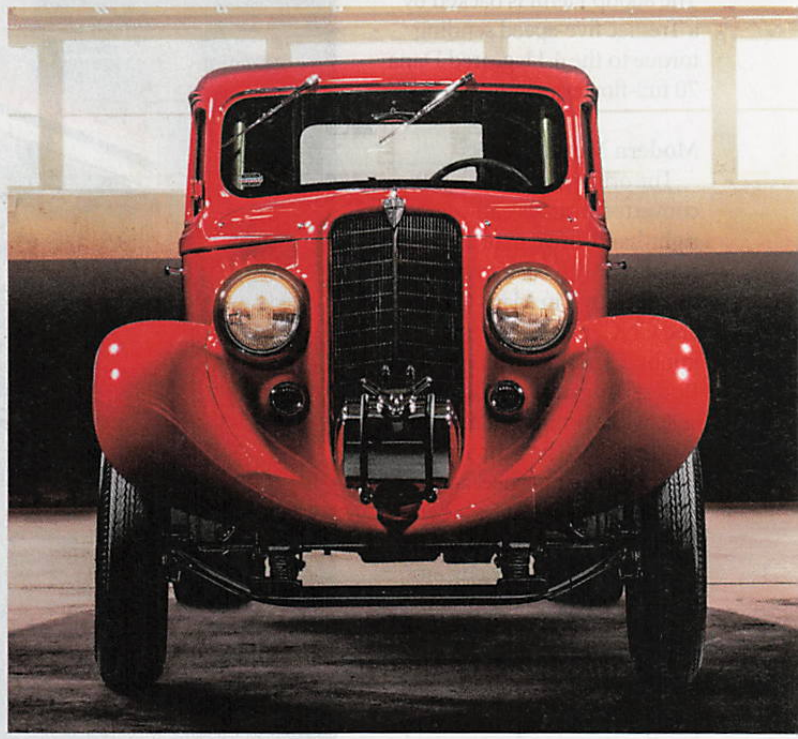
Building a Body From Fresh Steel

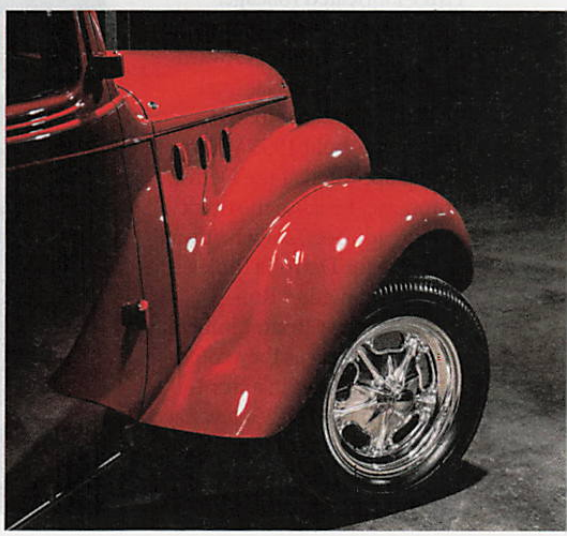
Because of the terrible condition of the sheetmetal, a big percentage of the body had to be built from scratch. "I wanted to make the cab and sheetmetal look as if it could have come from the factory—plucked off an original chassis and put on a wild tube chassis that was possibly built by some aviation nutjob," Limberg told us. "We reworked the body and built so much from scratch to make the lines more elegant than Willys ever would have considered. The roof was an opening filled with chicken wire, and the rear window looked like it was stolen from a school bus. There is probably only 35 percent of the original sheetmetal remaining. We redesigned it to give it a modern look while still trying to make it appear original to the untrained eye."

When the repairs and modifications were complete, The Refinery by Adam Krause in Manteno, Illinois, took over to complete the final bodywork and spray the Rosso Mugello Ferrari red paint.

Rare Arias V6 Hemi Engine

The same color, but with a satin finish, continues in the engine compartment. The 498ci Arias V6 Hemi is one of only five ever



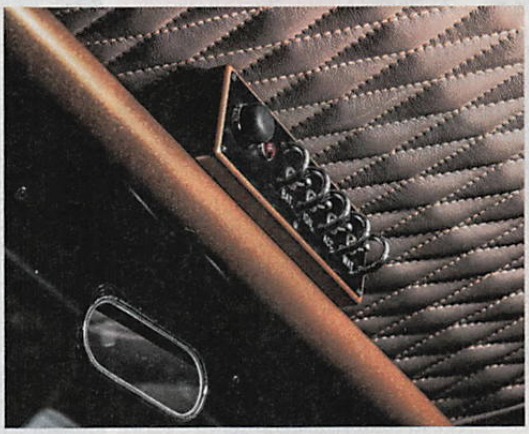


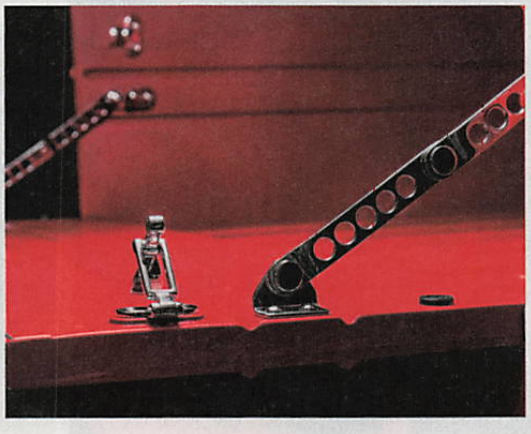
manufactured, Brian told us. "Nick Arias Jr. cut down one of his blocks and created a handful of these aluminum Hemis. Nick's experience building engines and developing pistons led to an extremely unique and powerful package. The truck is built around this engine, which was machined and assembled by Missile Engineered racing components. It is wider from valve cover to valve cover than it is long, which led to a ton of fabricated parts to get everything to fit right and be serviceable." The original Hilborn mechanical injection intake was modified for electronic fuel injection. TMG fabricated zoomie-style headers from 2½-inch tubing. The 800hp Hemi is backed by a Tremec five-speed sending torque to the 4.11-geared Dana 70 full-floater rearend.

Modern Meets Classic

The original steel dash was converted from its early days as a right-hand-drive mail truck and reworked with custom switches designed by Tin Man's Garage and CNC machined center knobs. Classic Instruments Hot Rod series gauges fit the retro style while bringing it into the modern day. The Schroeder Interior steering wheel adds Sprint-car flavor. At Schober's Custom Hot Rod Interiors in Norwalk, Illinois, the custom seat was built and upholstered in diamond stitched leather. The same upholstery treatment was applied to the door and kick panels. The cab is protected by a TMG-fabricated rollcage.

Five weeks after winning the Al Slonaker Memorial Award at the 2020 Grand National Roadster Show, the incredible scratch-built 1936 Willys pickup appeared at the Detroit Autorama. Because the truck had already been shown, it was ineligible for Detroit's Ridler Award, but neither Ron Ernsberger nor Brian Limberg minded, as long as they could display the Willys in a front-and-center spot only a few paces from the Ridler contenders, with the billet Slonaker trophy displayed alongside it. HR





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DEFCON 3

This Rusted Out 1963 Chevy II Becomes An Epic Pro Touring Ride.

It started as most projects do, a simple to-do list of some bodywork, paint, and a mild 350 engine. Then everything changed. The mild got mean, and this little 1963 Chevy II was soon on the fast track to Pro Touring, supercharged, LS madness.

Jason Scudellari, Motor Trend's long-time tech center manager, is no stranger to building cars. This car is the end result of years of wrenching, welding, metal working, and every other skill honed as our go-to fabricator in the heart of the magazine world.

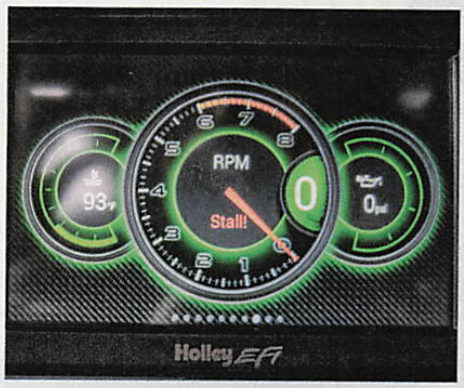
Steven Rupp

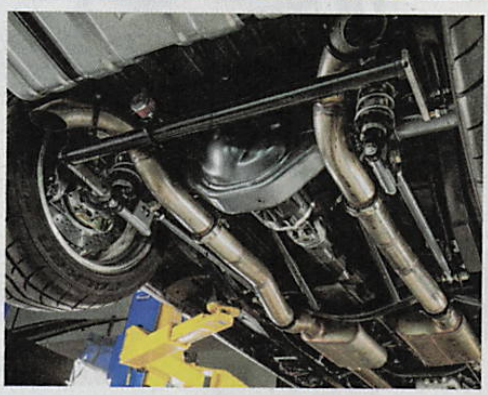
Jorge Nunez, Nick Licata, Evan Perkins & Joe Machaquerio

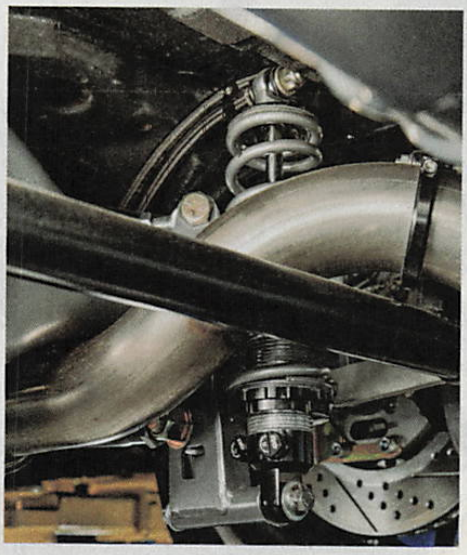
DEFCON 3

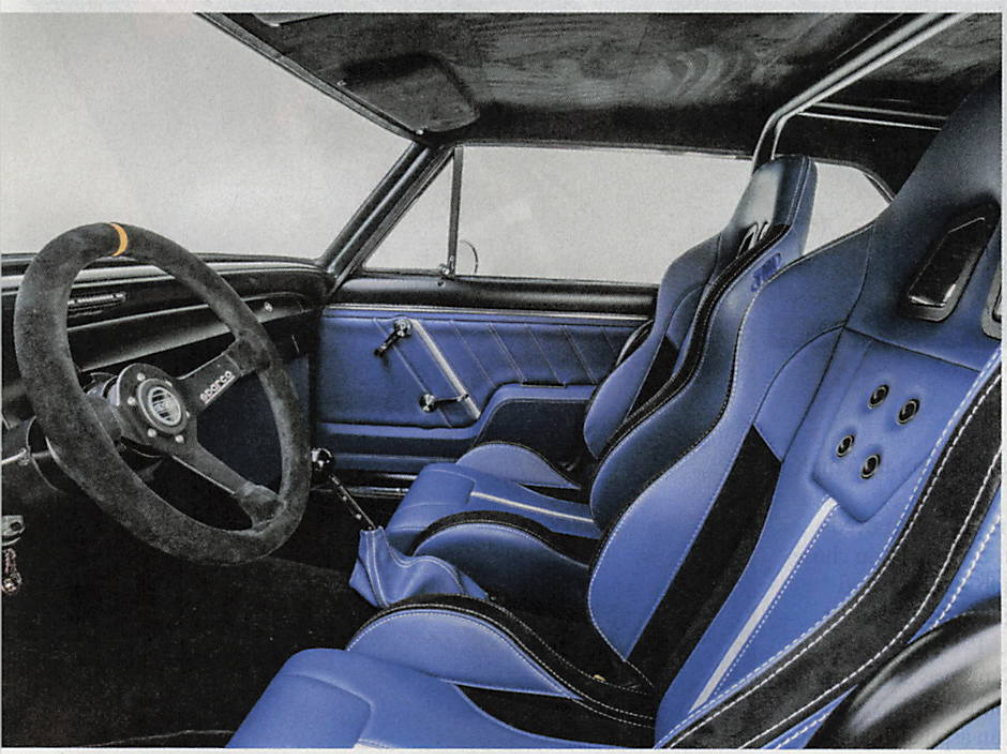
The Nova had a tumultuous life before finding its way into Jason's welcoming arms. It was purchased out of a field by a former *Super Chevy* editor, and it was equal parts climbing vines and car. Once in a garage, it was stripped to a bare shell, which revealed rust in the fenders, hood, quarters and doors. The years hadn't been kind and hopes for a quick bolt-on project were dashed. The car sat on a homemade body dolly for years before it was given to Jason, one of the few guys who had the skill set to tackle a revival of this magnitude.

"I was trying to build a simple cruiser," said Jason. "It was my wife's dream car." The car went under the knife in a big way at Superstition Restoration. The rust was repaired where necessary and panels too far gone were replaced with fresh metal from Golden Star Auto. Superstition helped hang the panels, set the body gaps, and get the car prepped for a wrap job by SoCal Wraps.









Once the uphill battle of bodywork was finished, the snowball really began to pick up speed and mass in the form of a G-Machine chassis from Schwartz Performance. "I was going to put a small-block Chevy and an automatic in it," said Jason. "But once the Schwartz chassis was underneath, I said to myself, 'I gotta make this car badass.' That's kind of where everything snowballed."

It was game on, DEFCON 3, and time to build the meanest Nova he possibly could.

The game-changer, the G-Machine chassis from Schwartz Performance, takes the handling of a first-gen Nova to neck-snapping levels. The flimsy, factory unibody is supplemented by a rigid steel spine, which hosts a modern four-link rear suspension, tubular upper and lower front control arms, rack and pinion steering, and improved geometry and rigidity in every imaginable square inch. QA1 remote reservoir coilovers modulate wheel movement, and custom American Legend three-piece wheels hold 275/35mm front, and 295/40mm rear Falken Azenis RT615K+ tires. Baer 6P 14-inch brakes in front and 13-inch out back help put the reigns on speed.

The car is no stranger to the autocross and has laid down some seriously fast laps on its new performance hardware. "At [Holley's] LS fest, we dialed in the shocks, and it's unreal how it drives," said Jason. "We have it where you can tweak the shocks and there is no body roll. It doesn't push in the corners, and you can drive it down the

DEFCON 3

street like a new car. On the trip to LS fest, we got 18 mpg at 75 mph on the highway!"

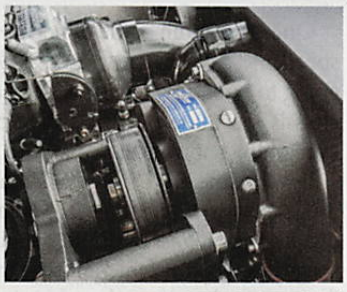
A chassis that can actually put the power to the pavement needs an engine willing to give it, and for the heart of the Nova, Jason chose a Chevrolet Performance LSX376-B8 to do the job. An LS-based crate engine, the B8 model is ready for boost right from Chevrolet, and boost it received in the form of a ProCharger P-1X blower. A more aggressive blower camshaft from Comp Cams was added into the crate engine, as well a full complement of Dominator EFI components from Holley. The total package delivers an asphalt-liquifying 670 horsepower to the rear tires at 8.5 psi of boost.

Cooling all the power in the Nova's engine bay is a custom copper radiator from U.S. Radiator mounted on a core support from Stoker's Hot Rod Factory. "It's a two-piece radiator to clear the ProCharger," Jason said. "It works great, and the car won't get over 190 degrees on the street or 200 degrees on the track!"

The limited underhood real estate meant that a standard air-to-air intercooler was out of the question. A little bit of science in the form of a two-stage water-methanol injection system solved the problem of keeping the supercharger's outlet air dense and cool.

The water/meth brought air temps from 153 degrees to 95 degrees," said Jason. "It's controlled by the Holley ECU, and it works great."

Backing up the power-dense engine is a Tremec Magnum XL transmission with a McLeod dual-disc clutch, shifter, and hydraulic throw-out bearing. Hydraulics for the brake and clutch systems are the work of a Tilton Engineering pedal assembly and master cylinders. A carbon-fiber driveshaft from GForce Performance Engineering sends power to a full-floating Moser axle with Eaton Detroit Truetrac differential.



The track readiness of the Nova under the skin is equally mirrored once the doors are opened. A full interior from TMI replaced all of the long-gone stock components and brought the style up 10 notches from where Chevy left it nearly 60 years ago.

"I added two layers of Dynamat to keep it quite inside," said Scudellari. "The windows don't rattle, and it really rides and drives like a brand-new car."

A Holley digital dash monitors engine vitals, and a rollcage from Art Morrison tucks neatly into the edges of the interior while providing a safe environment for passengers and driver alike. A removable set of door bars and rear seatbelt bar allow the back seats to remain functional, while a Vintage Air system keeps occupants cool. An American Autowire harness operates all of the electronic systems with ease.

As much of the Nova that's externally visible and in your face, there's an iceberg of custom touches hiding under the skin. To help with weight distribution and make room for the ProCharger blower assembly, the engine was set back 3 inches in the chassis, requiring the firewall be pushed back an equal amount. Every seam on the car was filled and smoothed, and a Detroit Speed mini-tub was installed to fit the massive Falken rollers out back.

New Classic Industries brightwork with a custom brush job pulls the eye, but a shaved fuel filler smooths the body lines. Fuel is now filled through the trunk into a Holley Sniper tank with in-tank fuel pump. Additional exterior customization can be found in the form of billet '67-'69 door handles from Eddie Motorsports and a stock hood re-worked with custom aluminum vents done by Jason.

It might not be the Nova he planned on. It might have taken twice as long and cost twice as much, but we're sure glad he built it. It's a bad-to-the-bone machine and one of the most aggressive first-gen Novas around. "It's not quite a daily driver," Jason said, "but it's something you absolutely could drive every day. HR

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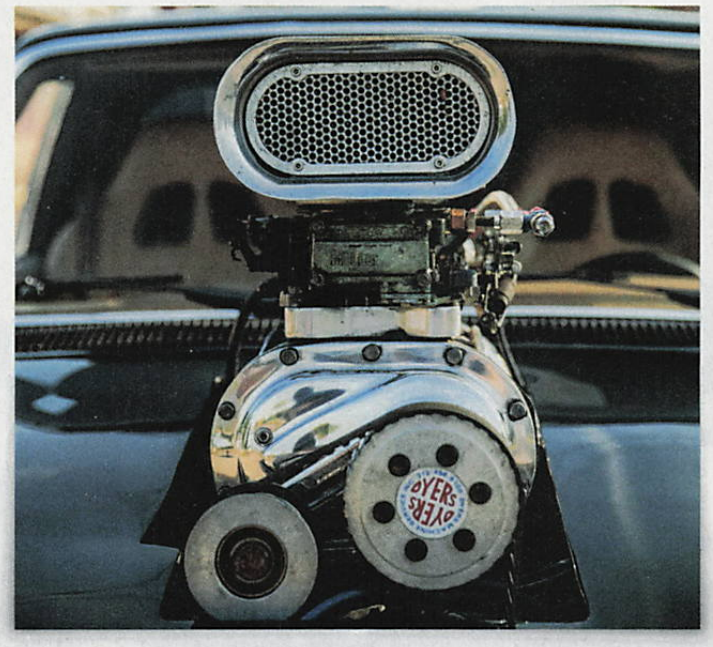


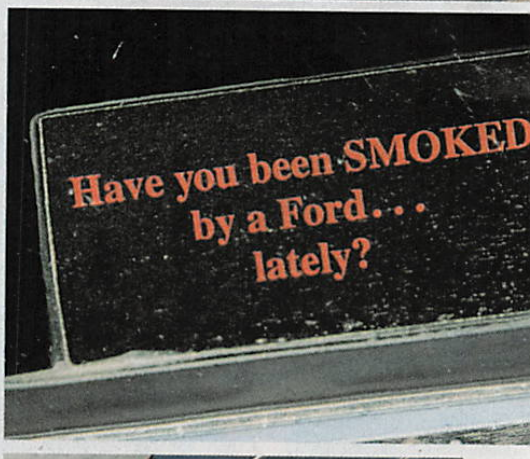
Inspired by Greatness

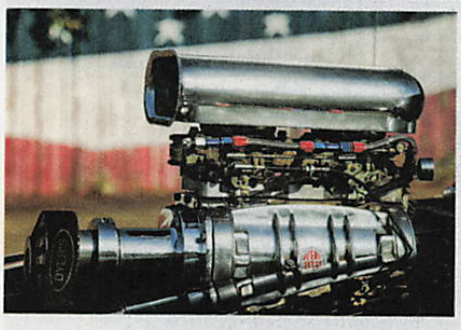
This Pro Street 1978 Mercury Zephyr is a Gen-Xer's Missing Link

The '80s Pro Street look is making a resurgence. The subculture of fat tires and big burnouts share one common adjective: ridiculous. Then there's the meshing of cars explicitly built for events like Power Tour—slim on excuses and big on driving. Jeremy Hart's '78 Mercury Zephyr is the perfect meshing of both: a Pro Street build that's meant to drive.

When Jeremy turned 14, his dad said it was time for a father-son project. "I just wanted a Fox-body Mustang," said Jeremy. "Like every 14-year-old kid." Then his dad showed him a Ford Fairmont. "I told him it was the ugliest car I'd ever seen." Despite his protest, his parents purchased the Zephyr and gifted it to Jeremy on Christmas Day, 1993. For those unfamiliar, the Fairmont and Zephyr share the same platform and body, with the Merc featuring a different grille and taillights.

Jesse Kiser





INSPIRED BY GREATNESS

When purchased, it had decent black paint, a complete interior, solid centerline wheels, and a 302/C4 drivetrain combo from a Fox-body Mustang. It was a father and son project that got Jeremy through high school.

During those adolescent days, he dreamed of Pro Street glory, with posters of the Cheez Whiz Bel-Air, Bill "Grumpy" Jenkins' Pro Stock car, and Rick Dobbertin's InNOVAtion Nova lining his walls. When he was finally old enough, he decided to build one—it was just 15 years too late. "When I was building the car, Pro Street was dead. No one was building those cars, but I grew up drawing cars with blowers and big, fat tires," said Jeremy. "It's what I've always wanted." Undeterred, he picked up a swap-meet 6-71 blower and started the build in 2001.

Once home with his swap-meet blower, he noticed the intake was for a tall-deck 351 Windsor and wouldn't fit his low-deck 302ci, so he went about building a stout 351ci Windsor with his dad nearly 20 years ago, to match his swap-meet Dyers 6-71 Roots blower. On only 3 pounds of boost and 87-octane fuel, the car makes nearly 500 hp to the wheels.

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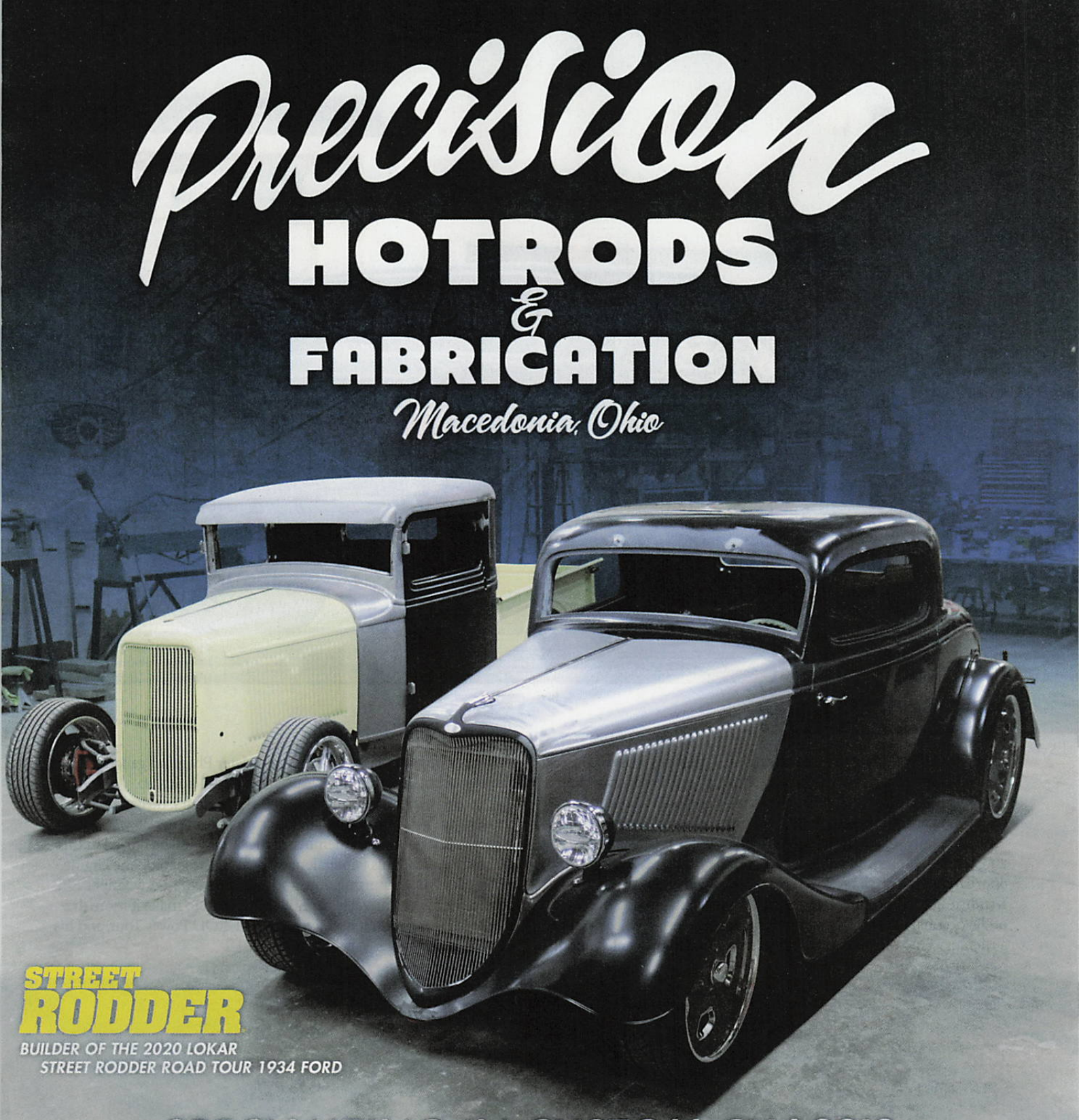

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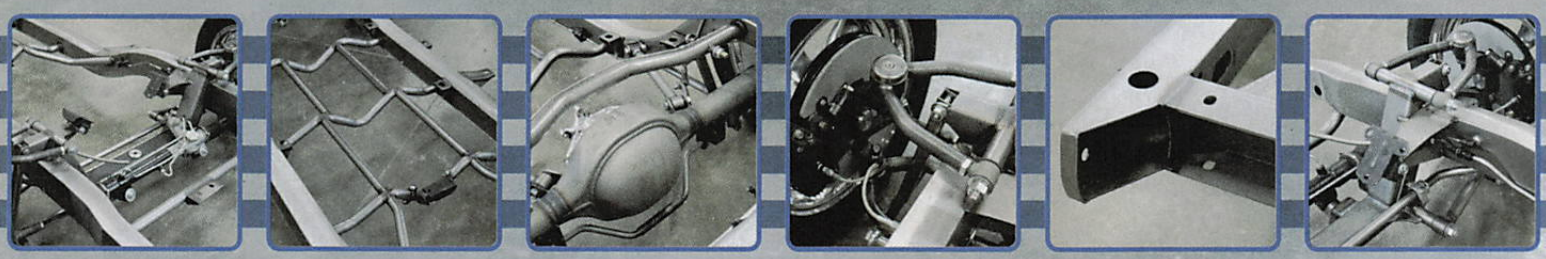

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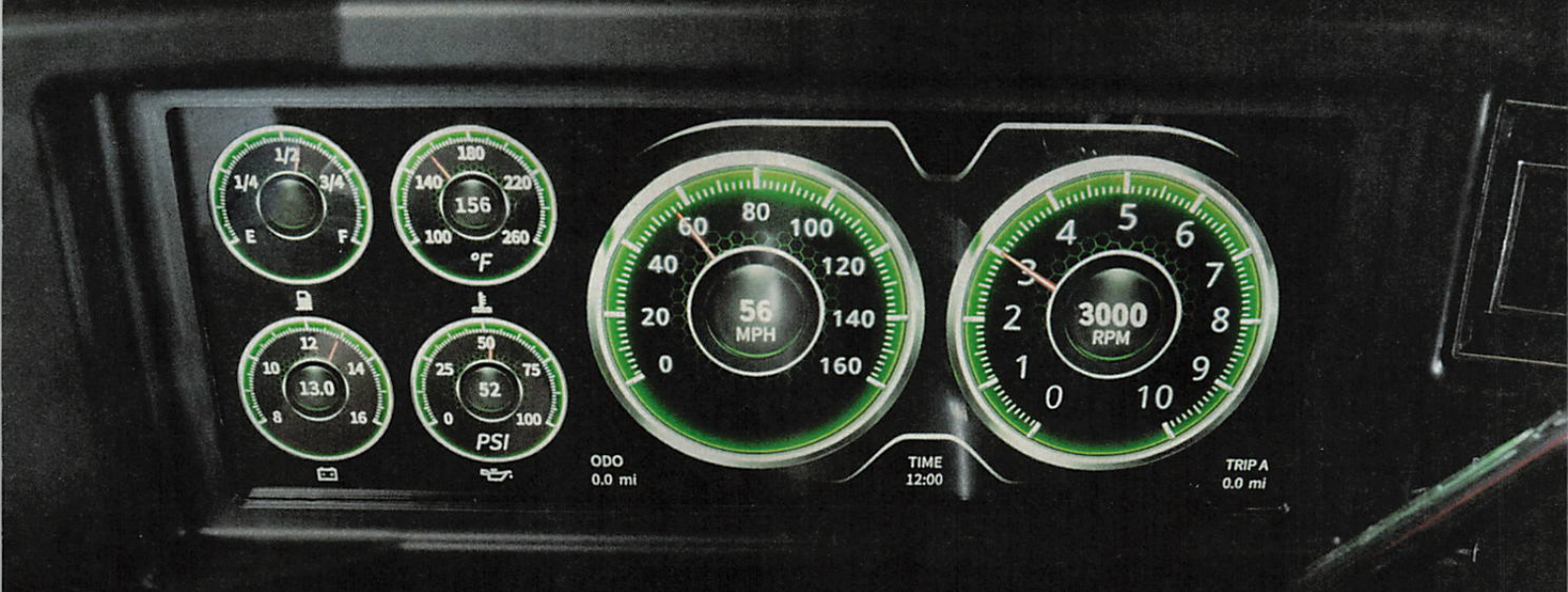
INSPIRED BY GREATNESS

I figured if I'm going to build an engine, I might as well cut the car in half," quipped Jeremy. The project snowballed. He began adding wheel tubs and a narrowed 9-inch rear axle and built a ladder-bar suspension and Competition Engineering coilovers. For the quintessential Pro Street look, he added polished Center Line Auto Drags and Mickey Thompson 165R-15 tires on the front and 28x18.5x15 Sportsman Pros on the rear. Jeremy worked with friend Wayne Krumrie at TMI Products for the custom seats that match the color of the original interior. The Grant Challenger steering wheel features a Mercury God of Speed lapel pin Jeremy glued to the center, and the factory woodgrain dash includes AutoMeter Phantom gauges. The paint was shot by a friend 15 years ago and still holds up.

After 18 years balancing family and the Mercury, he has a reliable cruiser and has done nothing but rack up miles. After 36 years of ownership, it's become a member of the family. "I'll be buried in this car," said Jeremy. This winter, Jeremy plans to freshen up the engine, add a B&M AOD transmission, and a dual throttle-body Sniper EFI system. "It's a very drivable car now, but I want to make it more drivable." He plans to run it in this year's HOT ROD Power Tour, and his 14-year-old daughter is itching to drive. HR



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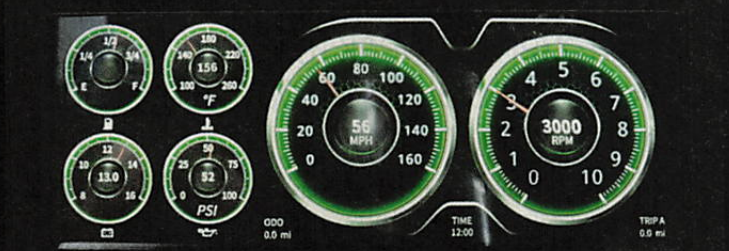

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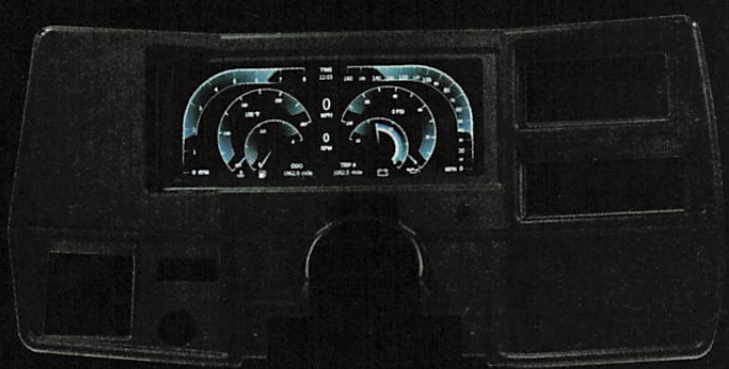

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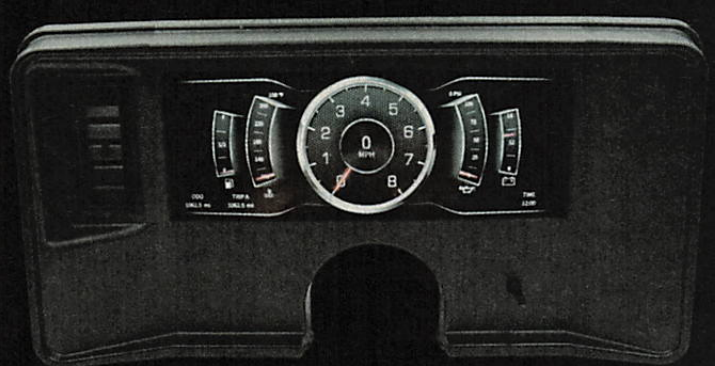

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The 7th Day

For our toughest Week to Wicked build yet, we needed all seven days to get our 1955 Chevy on the road!

As an ancient proverb states, every journey begins with a single step, and Monday is when we take that step in our CPP Super Chevy Week To Wicked Presented by Golden Star Classic Auto Parts. This time around we built a sweet "1955" Chevy. Why the quotes? Well, our '55 body was crafted out of new sheetmetal from Golden Star and sits on an aftermarket chassis provided by CPP. Add in all of the other aftermarket bits from companies such as American Legend, Bowler, Covercraft, Dakota Digital, Danchuk, Eaton, E-Stopp, Falken Tires, Gandrud Chevrolet, Hot Rods by Dean, Old Air Products, Painless, TMI, and United Pacific, and the end result is a 1955 created from 100 percent new parts! No rust and no damage from time or Mother Nature—just a sweet, clean canvas for us to work with.

For past builds, we've started with done cars, or shells of cars, but the parts going in were far less complicated and numerous. This time we started with a shell of a car made completely from fresh Golden Star sheetmetal by the guys at Real Deal Steel, and added every part you could think of. Full A/C system? Check. Power seats and windows? Check. Custom, one-off interior? Check. Latest GM LT1 engine? Check. Six-speed manual trans? Check. And the list goes on.

The entire car has fresh wiring, and between all the systems (LT1, trans, Raingear wipers, stereo, seats, A/C, and more) it was the single biggest project of the week. Typically, we finish our builds on the fifth day, but after working on the car for 13 hours on Friday we called it a day so we could start fresh Saturday morning. The fenders went on, the clutch was bled, and the front-end wiring was finalized. At noon on Saturday we had yet to even bump over the LT1, but the work continued. All the fluids were added, the fenders were buttoned up, and the Eddie Motorsports hood hinges bolted on in preparation for the Golden Star Smoothie hood. The interior wiring was finished and the Dakota Digital dash and matching clock was installed so the TMI dash cover could slide into its new home.

At 5 p.m. on Saturday the LT fired to life and, after debugging a few wiring glitches and fixing a small leak, the car was deemed roadworthy. But it was late and we wanted pictures, so we covered up the '55 and waited to road test it on Sunday. The drive went great and, to be honest, it drove and rode better than any W2W project we had done in the past.

By Steven Rupp Steven Rupp and Taylor Kempkes

Sources

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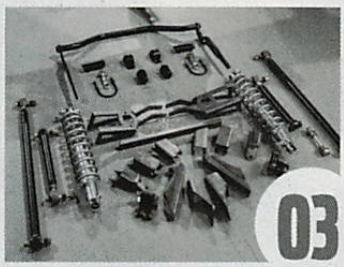
Real Deal Steel; 407.585.1957; realdealsteel.com

TMI Products; 951.272.1996; tmiproducts.com

United Pacific Industries; 562.421.3888; upcarparts.com

01 This was our starting point on Monday, a painted and trimmed-out shell of a 1955 Chevy sitting on an old chassis and cart for transport. Typically, we start with a complete car, so the bad news was we had a ton of parts to install. The good news was that we didn't need to spend half a day tearing the car down.

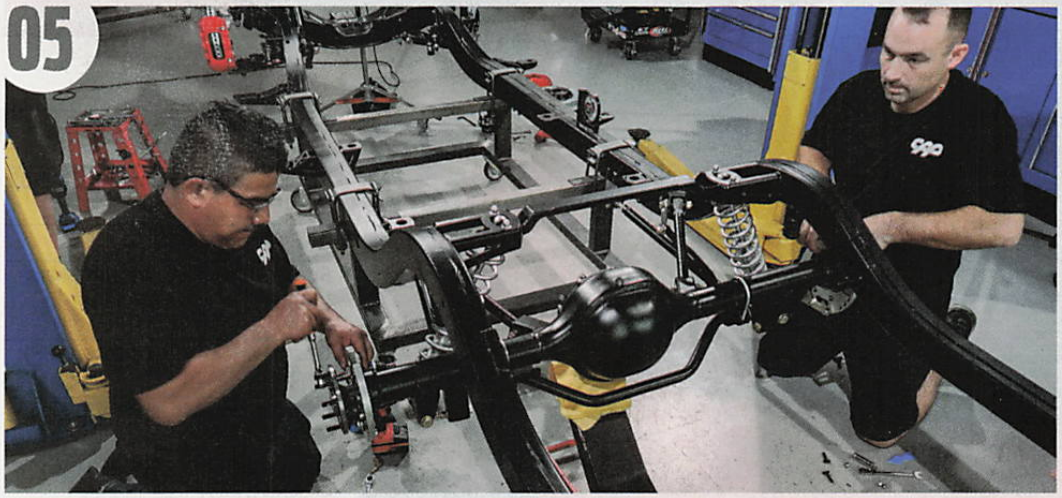
02 Cars with a full chassis are awesome since one team could work on the body (wiring, A/C, interior) while the other team assembled the new CPP chassis. Yep, everything you see here is brand new, including the frame.



03 This is the rear suspension kit from CPP. To save time, the brackets you see were already welded to the 9-inch housing. The large crossmember supports the top of the double-adjustable shocks.

04 Two crews tackled the CPP chassis—Jason Scudellari (*right*) and Christian Arriero from our MotorTrend Tech Center on the front and the CPP team on the rear.

05 The rearend came from CPP already assembled with Currie axles and a third member complete with an Eaton Truetrac limited-slip unit. We still had to install the brakes and bolt everything in place. The goal was to have the suspension fully installed on Monday.



06 And that included these beautiful six-piston brakes from CPP. This brake kit is built around CPP's new sealed-bearing hub spindle. It's the same arrangement found on modern cars, such as the Corvette, and it eliminates the hassle of tapered roller bearings and bearing grease.

07 Another first for us was installing this E-Stopp parking brake kit. Running cables is a pain, but the E-Stopp made it much easier. The main unit is weathertight and can be mounted anywhere, including in the interior, such as under the back seat. We chose to mount it to the passenger side of the CPP frame.

08 Wiring is always one of the demons we have to wrestle with on these builds. The problem is that it takes a lot of time to do it right and you can't take shortcuts. With that in mind, we started wiring in the Painless system, along with the other looms from the Gandrud LT engine to the Raingear wipers, on Monday. Six days later, we were still wiring.

09 By Wednesday we were done with the suspension, brakes, and doing all the plumbing for the chassis. We even had the fuel system, anchored by CPP's massive 29-gallon tank, installed. Given how well the rest was going, we put a couple of guys on assembling the radiator and core-support kit from Hot Rods by Dean. This system will look great, but more importantly, the larger radiator will help cool our LT1 and the system will give us much needed engine-bay space.

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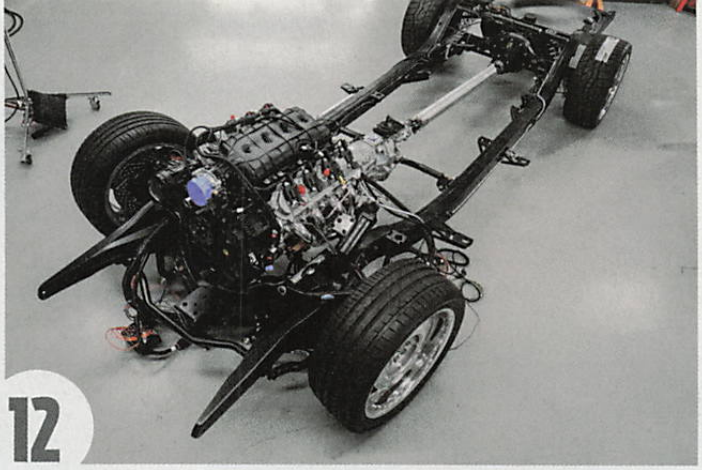

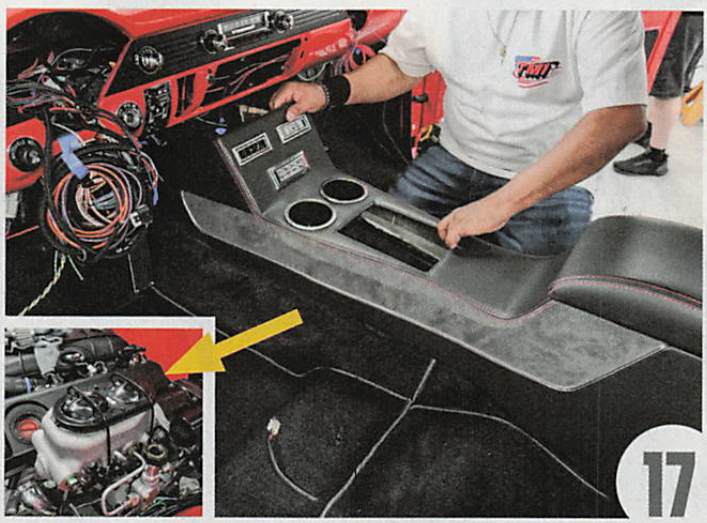

10 After spending much of Wednesday prepping the Gandrud Chevrolet LT1 crate engine and bolting it to the Tremec Magnum six-speed from Bowler Performance, we were ready to lower the combo onto the CPP chassis. Bowler's kit came complete, from the Quick Time bellhousing to the Tilton high-performance clutch.

11 With the engine in place we could see if the prototype Doug Thorley headers would fit; and they did, perfectly! There aren't many LT options on the market, but manufacturers are stepping up with new products on a regular basis.

12 With the headers installed and a new aluminum driveshaft in place, our chassis was ready to slide under the body. It was Wednesday and we were feeling pretty good about ourselves at this point, but there was still a lot to do.

13 We were a tad nervous when it came time to drop the body onto the chassis. Thankfully, it all went together so easily. The hardest part was getting the body off of the transport cart and positioned on the lift correctly so it could be lowered onto the frame.

14 Moments later the body was fully bolted to the CPP chassis! It was late on Wednesday and we opted to call it a day.

15 Thursday morning had Lee Watts from the Muffler Man in Placentia, California, on hand to help us install a modified Pypes exhaust system. For now we kept it basic, but later he will spend a few days TIG welding in a permanent, over-the-axle system.

16 The Hot Rods by Dean cooling system assembled earlier was then installed on the chassis. This was critical so that we could finish plumbing all of the systems, including the power steering and CPP Hydrastop, since the power-steering reservoir is part of the core support.

17 The CPP Hydrastop (*arrow*) and CPP tilt steering column were installed early on Thursday. This was important since it needed to be done before the guys from TMI showed up to tackle the interior. As a rule of thumb you can expect a custom interior shop to have your car for a month, at the very least, if you want a one-off look. The beauty of TMI is that they offer so many options that you can have a custom look nearly overnight. All the pieces for our mini-tubbed '55 were premade at TMI so the process was more about installation and less about fabrication. This was our first Week To Wicked with power windows and seats, which added to all of the wiring we had going on.

18 After the center console was installed, the TMI crew tackled the rest. We loved the sculpted front and rear seats, which looked stunning and were comfortable as well. The one-piece TMI headliner was installed before the front windshield was put in place.

19 The TMI trunk kit simply snapped into place and was even designed with a kick-out for the trunk-mounted battery.

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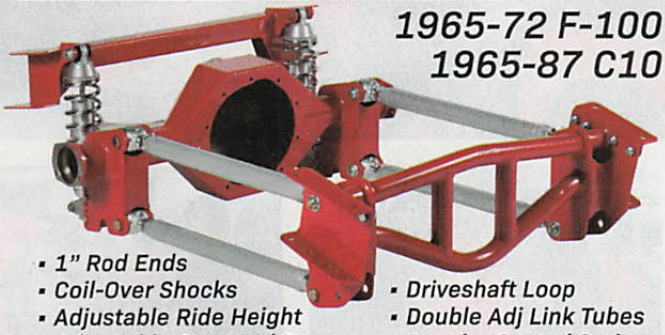

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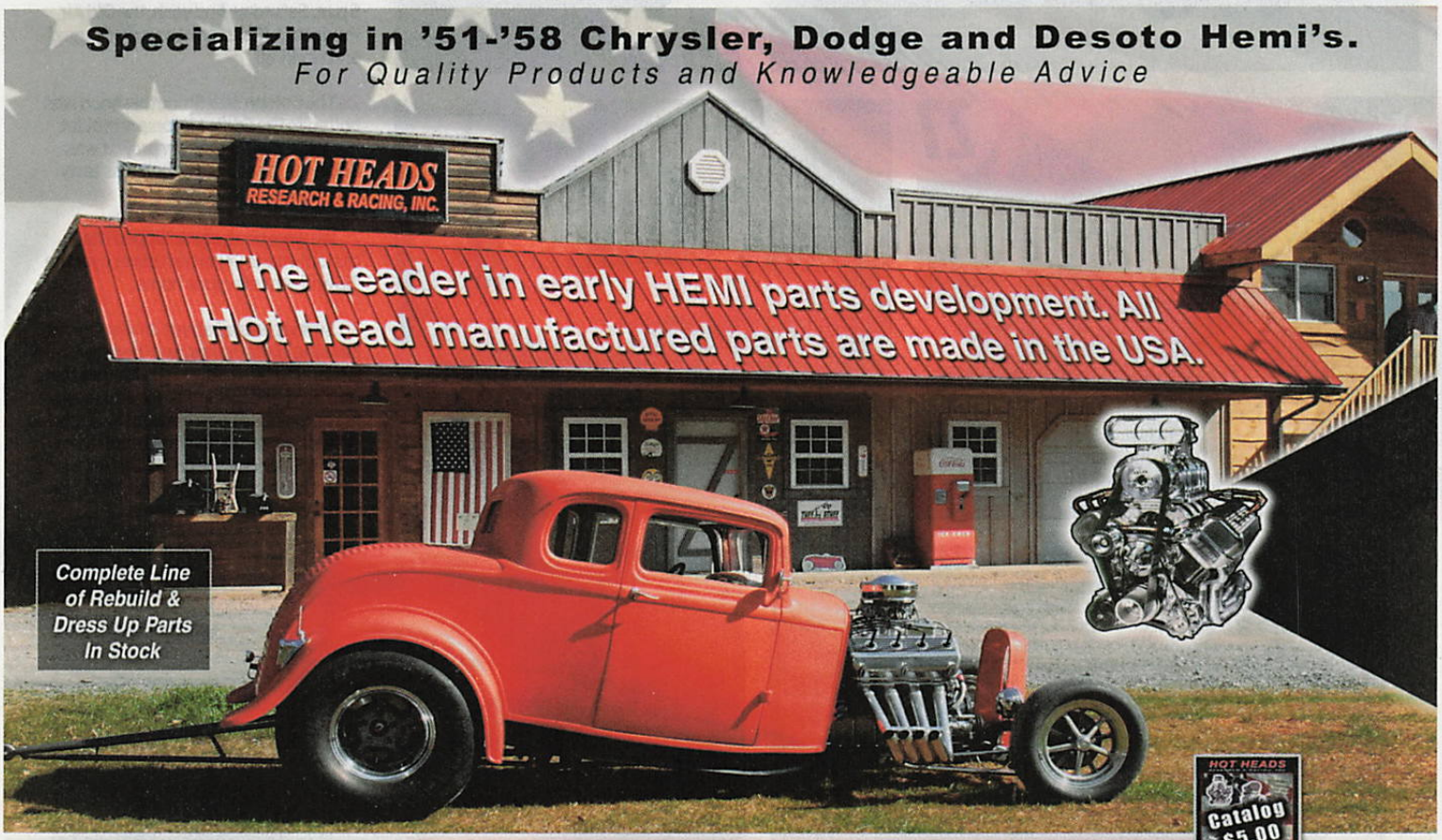
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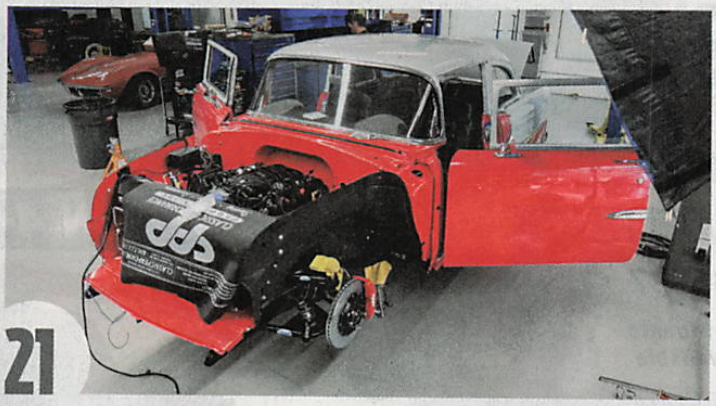

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20 With the wiring under the dash done and the Old Air Products A/C system installed, we could put the Dakota Digital RTX dash in place.

21 The rest of Friday was spent wiring, plumbing, adjusting, and fine-tuning all the parts we had been installing over the last five days.

22 With all the work done in the engine bay it was time to install the fenders and finish up the front of the car. Meanwhile, another team was at the back installing the smooth Danchuk rear bumper.

23 Saturday we were installing the front brightwork from Danchuk and the LED lighting from United Pacific.

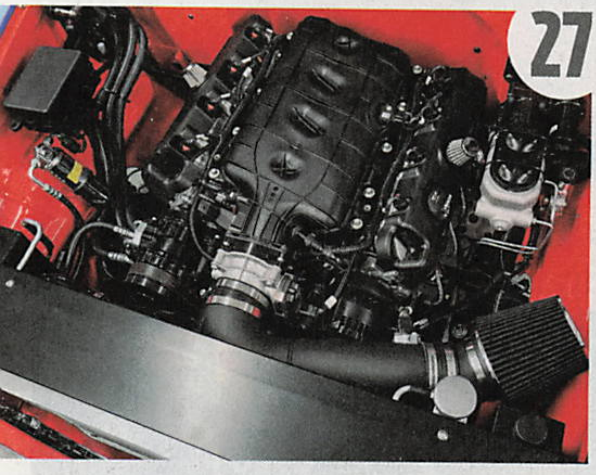
24 Also Saturday, the Falken tires were mounted to the 18-inch American Legend Racer wheels. Once balanced, we attached the center caps and got them on the '55.

25

26

25 If you're building a car, we highly recommend using a set of builder blocks. Our tech center manager Jason Scudelari made these, giving us a stable platform to work on the car with the suspension fully loaded.

26 Next, the smooth front bumper from Danchuk was intalled. It fit tight to the body so we utilized blue tape to protect the paint.



27

28

27 The LT1 has a specific way it has to prime before firing. After following the instructions that came with the Gandrud crate engine, the LT roared to life at 5 p.m. Saturday. And yeah, the Old Air Products A/C system was fully charged and working!

28 The Golden Star Smoothie hood was bolted to the Eddie Motorsports billet hinges, and with that our project was done—as far as assembly. It was early evening of the sixth day.

29 We were beat, so we slipped the custom-made Covercraft cover over the '55 and sent everyone home.

30 Sunday was all about driving the car, bedding in the brakes, and looking for any issues. The '55 rode great and everything was tight and solid, with minimal road noise. Even the Custom Autosound stereo system worked! This was our toughest build to date but the result was our best, most complete build yet. The only question is what will we tackle next? HR

29

30

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CANDY APPLE

Pontiacs don't really pop up on a computer search for the most popular pre-muscle car hot rods. Chevys dominate in a mid-1950s popularity contest, but a 1955 Pontiac has the same potential for coolness—if not more—because of the "something different" status.

Likewise, when we think of West Coast hot-rodding spots, the places that come to mind right away are Pomona, Burbank, Bakersfield, Pasadena, and a few others. But if you go up the coast about 50 miles from Los Angeles, you'll find a lot of activity in Ventura County. There is a lot of really nice iron in the shops and

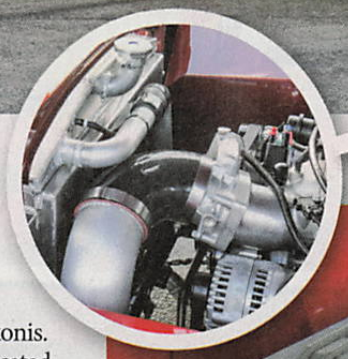
CHIEF

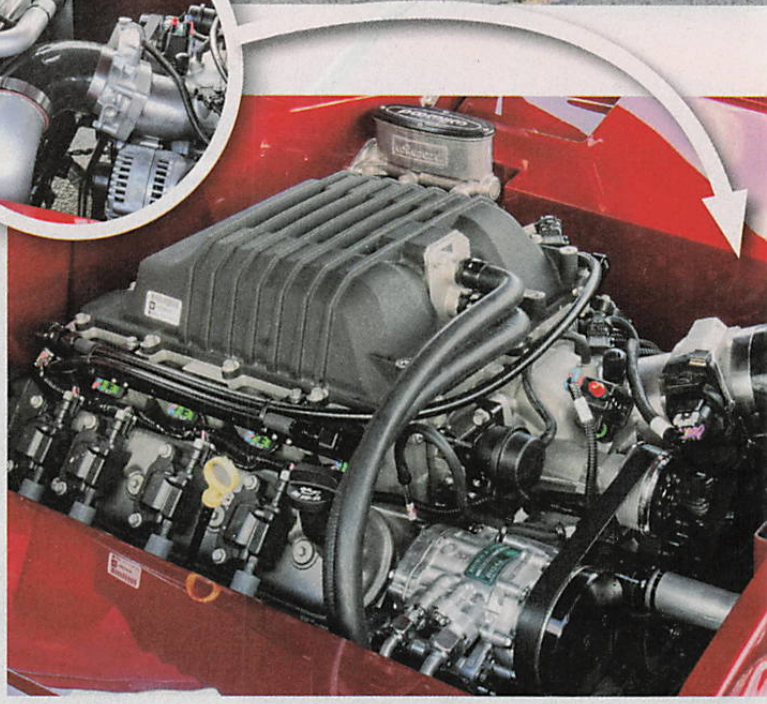
Hot Rodding A 1955 Pontiac Chieftain

Tim Bernsau

garages of Ventura, Oxnard, and Camarillo, including this 1955 Pontiac Chieftain belonging to Charlie Utts.

When the new Pontiacs were introduced for the 1955 model year, they—like their cousins on the Chevy side of the GM family—had a new, much more modern appearance. The car's good looks, as well as the warmly welcomed 287 V8 engine, resulted in record sales. Charlie Utts' mother was one of the many customers who bought a new Pontiac that year. She drove it for the rest of her life, but she didn't drive it far. When she passed away the car had only 39,000 miles on the odometer. After that, the 1955 Chieftain bounced from family





CANDY APPLE CHIEF

member to family member before landing with Charlie. After a long period in storage, he made the decision to have the old Chieftain rebuilt into something better than ever.

We'd heard about Charlie's Pontiac from builder Jason Pecikonis. Pecikonis owns Timeless Kustoms in Camarillo, California, located just a few minutes from Charlie's house. The shop is known for some pretty ferocious 1960s-era hot rods—as well as a couple of amazing 1959 Chevy Impalas and an LS3-powered 1959 Chevy Biscayne wagon that were featured in *Street Rodder* magazine.

We got our first look at the car at the Hot August Nights show in Reno, Nevada, and were blown away by the retained resto details and front-to-back upgrades that suit the car perfectly. The body was repaired and perfected but kept stock, complete with exterior trim pieces, hardware, and badging. The Candy Apple Red paint makes an impressive first impression, especially the way it continues onto the Center Line Smoothie wheels. Those 20-inch wheels, combined with wide, low-profile Firestone Firehawk radials, are the ideal contrast to the restored exterior.

Original style continues inside the car, where modern elements have been blended into the stock appearance. Eric Thorsen's light saddle tan upholstery covers the factory bench and custom door panels in patterns that aren't identical to original but definitely show the influence. Vintage Air A/C and an up-to-date audio system were installed stealthily.

Nostalgia disappears under the hood and under the car. The fabricated firewall and inner fenders surround a 2014 Chevy LSA 6.2L engine. Chevy planted these engines, topped with a factory 1.9-liter supercharger, in the engine compartments of the ZL1 Camaro in the early teens. We love the fact that one is hidden unsuspectedly under the stock Pontiac hood.

None of the 1955 Pontiac chassis remains. In its place is a C6 Corvette front suspension and an Art Morrison triangulated four-link rearend locating a Currie 9-inch, all built upon an Art Morrison 4x4-inch frame. Strange Engineering double-adjustable coilovers and Corvette Z06 14.5-inch disc brakes were added at all corners.

The Pontiac might look a little tamer than most of the street machines built by Jason Pecikonis and his team at Timeless Kustoms, but the design, technology, and craftsmanship in this car is equal to everything rolling out of the shop. HR

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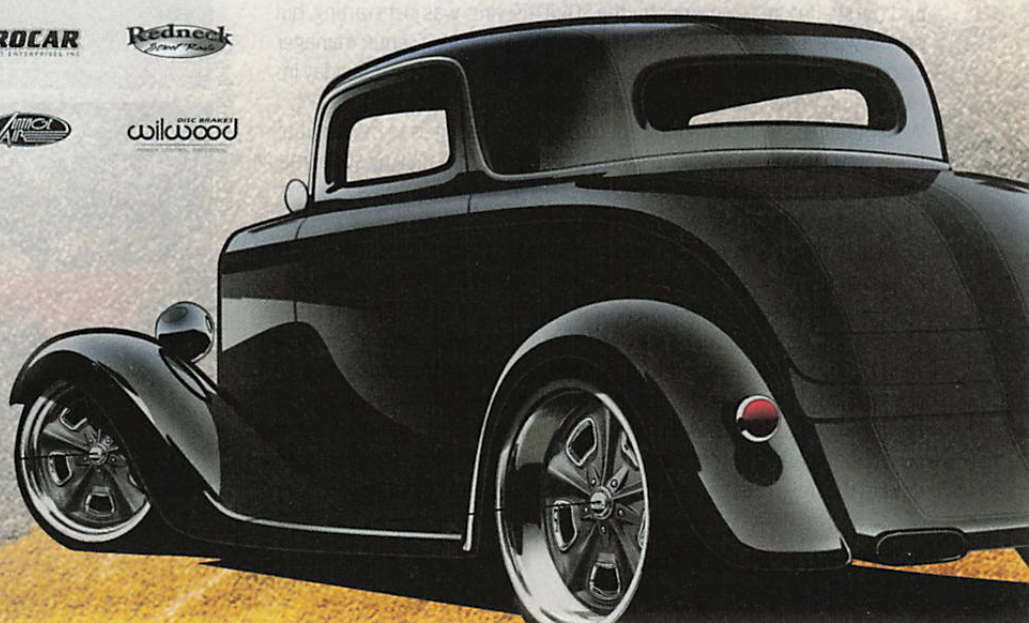

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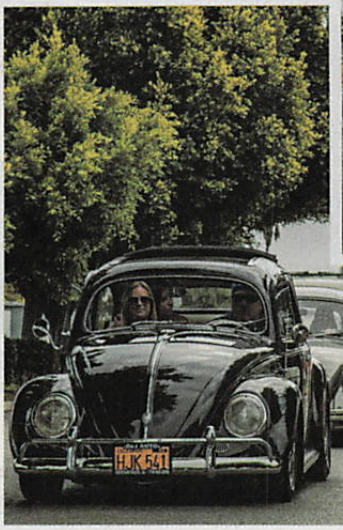

ON THE SCENE

Quarantine Car Weekly Cruise in SoCal draws nearly 1,500 cars!

Steven Rupp Brandon Lim

Like many good ideas, it started out of boredom. It was early April, and the shelter-in-place order for the COVID-19 virus was just starting, but people were already getting cabin fever. MotorTrend tech center manager Jason Scudellari and Hek Valdez were cruising their trucks on a Sunday in Huntington Beach, California. As Jason told us, "After we parked, Patrick Wagenbrenner started shooting our trucks, while telling us to move out of the way. He was with Keystone Automotive Operations making social media content. After some discussion, they decided to organize a cruise the next Sunday in an effort to draw a few more cars.

Well, that first "official" cruise drew 35 cars and trucks. What had become known as the Quarantine Cruise has grown organically over social media. With additional help from Ken Johnson, the second and third meetings saw 135 and 500 cars participate, and the most recent cruise exploded to more than 1,500 cars. All along, participants were asked to either stay in their cars or to comply with social distance and personal protection guidelines. Participation has been a wide mix of people from kids to celebrities, but the common thread is that they are all hot rodders that wanted to get out and drive in the fresh coastal air and sunshine of Southern California.

Additional photos provided by Tyler Cates, Will Estrada, and Rodney Kline

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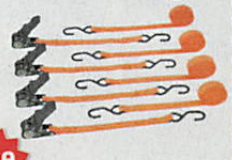

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ITEM 60343 67338 shown

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36589654 LIMIT 2 - Exp. 9/24/20*

SUPER COUPON

CENTRAL PNEUMATIC ★★★★½ (739)

40 lb. Capacity Floor Blast Cabinet

$149.99

$189.99

Save $150

Includes gun with ceramic nozzle, hose and gloves.

Compare to Shop Tuff 47187 $299.99

ITEM 62144 68893 shown

Use Online & In-Store

36592651 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

Heavy Duty Foldable Aluminum Sports Chairs ★★★★★ (4564)

YOUR CHOICE OF COLOR

$19.99

$29.99

Save 50%

Green ITEM 63066/62314 shown

Blue ITEM 56719 NEW

Compare to Coleman 635394 $39.99

Use Online & In-Store

36599768 LIMIT 3 - Exp. 9/24/20*

SUPER COUPON

U.S. GENERAL (186)

30", 4 Drawer Tech Cart

- 12,600 cu. in. of storage
- 580 lb. capacity

YOUR CHOICE OF 6 COLORS

Save $730

$149.99

$199.99

Compare to Snap-on Blue-Point KRBC10TBPC $880

Side tray sold separately.

ITEM 56391, 56393, 64096, 56392, 56390, 56394

Use Online & In-Store

36601044 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH #1 SELLING JACKS IN AMERICA (1364)

Rapid Pump® 1.5 Ton Lightweight Aluminum Floor Jack

$59.99

$79.99

Save $91

Compare to K Tool KTI63094 $151.42

ITEM 64552 64832/64980 64545 shown

Use Online & In-Store

36612487 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

CEN-TECH (3737)

Automatic Battery Float Charger

$4.99

$9.99

Save 83%

Compare to Schumacher Electric SC1 $30.41

ITEM 64284/69594 69955/42292 shown

Use Online & In-Store

36613332 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

Haul Master (1218)

3/8" x 14 ft., Grade 43 Towing Chain

$19.99

$39.99

Save 69%

Compare to Mibro 426920 $64.99

ITEM 40462/60658 97711 shown

Use Online & In-Store

36616176 LIMIT 3 - Exp. 9/24/20*

SUPER COUPON

BRAUN (7715)

5000 Lumen 4 ft. LED Hanging Shop Light

$19.99 $29.99

Save 33%

Use Online & In-Store

ITEM 64410

36618793 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

McGRAW (578)

20 Gallon, 135 PSI Oil-Lube Air Compressor

$164.99

$189.99

Save $85

Compare to Porter-Cable 118903799 $249.99

ITEM 56241 64857 shown

Use Online & In-Store

36619538 LIMIT 1 - Exp. 9/24/20*

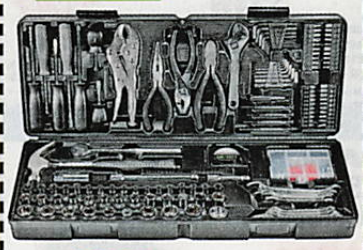
SUPER COUPON

PITTSBURGH (3579)

LIFETIME WARRANTY

SAE AND METRIC

130 Piece Tool Kit with Case



$29.99

$39.99

Save 54%

Compare to Anvil A137HOS $66.39

ITEM 68998/64263 63248/64080 63091 shown

Use Online & In-Store

36620145 LIMIT 2 - Exp. 9/24/20*

SUPER COUPON

PREDATOR (3158)

6.5 HP (212 cc) OHV Horizontal Shaft Gas Engine

$99.99

$119.99

Save $230

Compare to Honda GX200UT2QX2 $329.99

ITEM 60363/69730 shown

ITEM 69727 CALIFORNIA ONLY

Use Online & In-Store

36623137 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH (1112)

1 Ton Capacity Foldable Shop Crane

$139.99

$189.99

Save $90

Compare to Goplus GP-101040150 $229.99

ITEM 69512 61858 shown

Use Online & In-Store

36625322 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH (690)

18 Piece SAE and Metric T-Handle Ball End Hex Key Set

LIFETIME WARRANTY

$12.99

$17.99

Save 59%

ITEM 63167/63166/96645 shown

Compare to Husky HTHKSM14PCN $32.10

Use Online & In-Store

36641078 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

PORTLAND (5325)

1750 PSI Electric Pressure Washer

$79.99

$99.99

Save $94

Compare to Briggs & Stratton 20600 $174.44

ITEM 63255 63254 shown

Use Online & In-Store

36642157 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH (4046)

Pneumatic Adjustable Roller Seat

$19.99

$27.99

Save 71%

Compare to Duralast TR6201C $69.99

ITEM 61160/63456 46319 shown

Use Online & In-Store

36646049 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

HaulMaster (4674)

18" Working Platform Step Stool

$19.99

$29.99

Save 50%

Compare to Neocraft 60635 $39.99

ITEM 62515 66911 shown

Use Online & In-Store

36649053 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH (817)

1000 lb. Capacity Engine Stand

$49.99

$59.99

Save 44%

ITEM 69886/69520 shown

Compare to OEM 24839 $89.99

Use Online & In-Store

36653064 LIMIT 2 - Exp. 9/24/20*

SUPER COUPON

Kenway (690)

12v LED Magnetic Towing Light Kit

$22.99

$34.99

Save 46%

Compare to Blazer C7300 $42.65

ITEM 64282

Use Online & In-Store

36653147 LIMIT 2 - Exp. 9/24/20*

SUPER COUPON

drill master (5991)

4-1/2" Angle Grinder

$9.99

$14.99

Save 50%

Compare to Ironton 61451 $19.99

ITEM 69645 60625 shown

Use Online & In-Store

36655374 LIMIT 4 - Exp. 9/24/20*

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HARBOR FREIGHT
QUALITY TOOLS AT RIDICULOUSLY LOW PRICES

Shop When You Need To Online & In-Store

SUPER COUPON

PREDATOR BEATS HONDA

★★★★★ (2972)

3500w Super Quiet Inverter Generator

PREDATOR 3500

3500	MAX. STARTING WATTS	3000
3000	RUNNING WATTS	2800
100 lbs.	WEIGHT	131 lbs.
2.6 GAL	TANK SIZE	3.4 GAL
4	OUTLETS	4
YES	OVERLOAD PROTECTION	YES
212cc	ENGINE SIZE	196cc
YES	LOW OIL ALERT	YES
YES	PARALLEL CAPABLE	YES
YES	POWER SAVER	YES

HONDA EU3000iS1A

$769.99 Save $1,249

~~$709.99~~ PRICE $2,019

Use Online & In-Store

ITEM 63584/56720 shown

3687011 1 LIMIT 1 - Exp. 9/24/20*

*HONDA EU3000iS1A stated specs

SUPER COUPON

PITTSBURGH PRO ★★★★★ (1818)

1/2" Drive, 25" Breaker Bar

LIFETIME WARRANTY

$8.99 ~~$13.99~~ Save 62%

Compare to Duralast 72-121 $23.99

Use Online & In-Store

ITEM 60819/67933 shown 3666725 4 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

HaulMaster ★★★★★ (4258)

30" x 18" Hardwood Dolly

• 1000 lb. capacity

$11.99 ~~$15.99~~ Save 39%

Compare to Milwaukee 33700 $19.97

ITEM 92486/39757 60496/62398/61897 38970 shown

Use Online & In-Store

3666819 6 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

Grant's GARAGE ★★★★★ (937)

14" x 13" Shop Towels Pack of 50

Mechanic's Choice

$8.99 ~~$11.99~~ Save 50%

Compare to Viking 874900 $17.98

Use Online & In-Store

ITEM 63365/64730/56119 63360 shown

3668031 3 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

HaulMaster ★★★★★ (446)

Triple Ball Trailer Hitch

$19.99 ~~$31.99~~ Save 66%

Compare to Reese Towpower 101179799 $59.99

Use Online & In-Store

ITEM 64311/64286 shown 3669348 4 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

CENTRAL PNEUMATIC ★★★★★ (1562)

3/8" x 50 ft. Retractable Air Hose Reel

$59.99 ~~$79.99~~ Save $39

Compare to Kobalt SGY-AIR184 $99

Use Online & In-Store

ITEM 69265/62344 64685/93897 shown 3671349 9 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH ★★★★ (867)

6" Digital Caliper

Includes two 1.5v SR44 button cell batteries.

SAE AND METRIC

$9.99 ~~$17.99~~ Save 66%

Compare to Husky 1467H $29.97

Use Online & In-Store

ITEM 63711/61585 62387/47257 shown 3671393 2 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

COVERPRO ★★★★ (1762)

10 ft. x 17 ft. Portable Garage

$169.99 ~~$199.99~~ Save $120

Compare to Shelter Logic 76377 $290.75

Use Online & In-Store

ITEM 62859/63055 62860 shown

3671411 4 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

WARRIOR ★★★★★ (58)

1500w Dual Temperature Heat Gun (700°-1000°)

$8.99 ~~$14.99~~ Save 67%

Compare to Black + Decker HG1300 $28.06

Use Online & In-Store

ITEM 56433/56434 shown 3672738 6 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

MADDOX ★★★★★ (252)

7 Piece Body and Fender Set

Save 50% ~~$39.99~~ $29.99

Compare to ATD Tools 1067923 $59.99

ITEM 63259

Use Online & In-Store

3673796 7 LIMIT 3 - Exp. 9/24/20*

SUPER COUPON

0.30 cal. Ammo Dry Box

★★★★★ (7025)

$3.49 ~~$5.99~~ Save 65%

Compare to RangeMaxx 1312-92 $9.99

Use Online & In-Store

ITEM 63135/61451 shown 3689253 5 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

4 Piece Anti-Fatigue Foam Mat Set

★★★★★ (2873)

$6.99 ~~$8.99~~ Save 65%

Compare to Norsk 001119346 $19.99

Use Online & In-Store

ITEM 40187/61607/62389 94635 shown

3674190 3 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

CENTRAL MACHINERY ★★★★ (526)

10", 12 Speed Benchtop Drill Press

$99.99 ~~$139.99~~ Save $61

Compare to Wen 4212 $161.97

Use Online & In-Store

ITEM 63471/60237 shown 3674439 4 LIMIT 2 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH AUTOMOTIVE ★★★★ (2532)

Multi-Use Transfer Pump

$3.99 ~~$6.99~~ Save 73%

Compare to Shop Craft 36667 $14.99

ITEM 63144/3878 61364/63591 66418 shown

Use Online & In-Store

3674970 8 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

CENTRAL MACHINERY ★★★★ (3072)

Foldable Sawhorse

$8.99 ~~$12.99~~ Save 50%

Compare to Stanley STST11200 $17.99

Use Online & In-Store

ITEM 60710/61979 shown 3675442 5 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

CENTRAL MACHINERY ★★★★ (167)

36" Metal Brake with Stand

$189.99 ~~$239.99~~ Save $307

Compare to Black Bull BK36 $497.08

Use Online & In-Store

ITEM 62518/62335 91012 shown

3675584 6 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

10" Pneumatic Tire

★★★★★ (4573)

$3.99 ~~$6.99~~ Save 50%

Compare to Farm & Ranch FR1055 $8.09

ITEM 69385/62388 62409/62698 30900 shown

Use Online & In-Store

3675586 5 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

Bauer ★★★★★ (932)

5" Deep Cut Variable Speed Band Saw

$99.99 ~~$134.99~~ Save $169

Compare to Dewalt DWM120 $269.96

Blade sold separately.

ITEM 64194/63763 63444 shown

Use Online & In-Store

3675609 6 LIMIT 2 - Exp. 9/24/20*

SUPER COUPON

BUNKER HILL SECURITY ★★★★ (4204)

Wireless Security Alert System

$9.99 ~~$14.99~~ Save 69%

Compare to First Alert SFA600 $32.99

Use Online & In-Store

ITEM 61910/62447 93068 shown

3675609 7 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

EARTHQUAKE XT ★★★★★ (1279)

20v Lithium-Ion 1/2" Extreme Torque Impact Wrench Kits

1/2" Anvil
ITEM 63537/64195/63852 shown

2" Extended Anvil
ITEM 64349

1200 FT. LBS. TORQUE BOLT BREAKAWAY

Includes battery and charger.

YOUR CHOICE
$229.99 ~~$269.99~~

Save $494

Compare to Snap-on CT8850PDB, CTB8185BK, CTC720 $724.85

Use Online & In-Store

36756272 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

200 Lumen LED Super Bright Flip Light
★★★★★ (5685)

$1.99 ~~$3.99~~

Save 60%

Compare to Premier SW-SWITCH-12/24 $4.99
ITEM 64723/64189 63922 shown

Use Online & In-Store

36762767 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

HARDY ★★★★★ (298)

Mechanics Gloves

AVAIL. IN SM, MED, LG, XL, XXL

$4.99 ~~$5.49~~

Save 66%

Compare to Valeo 25521 $14.99
ITEM 62434, 62426, 62433, 62432, 62429, 64179, 62428, 64178 shown

Use Online & In-Store

36769243 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH ★★★★★ (1891)

LIFETIME WARRANTY

13 Piece, 1/2" Drive Deep Impact Socket Sets

Item 69560 shown

YOUR CHOICE
$19.99 ~~$24.99~~

Save 63%

TYPE	ITEM
SAE	69280/69333/69560/67903
METRIC	69279/69332/69561/67904

Compare to Husky H2DSAEI11PCSR $55.51

Use Online & In-Store

36773180 LIMIT 3 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH AUTOMOTIVE ★★★★★ (493)

1250 lb. Capacity Vehicle Positioning Dolly

$64.99 ~~$89.99~~

Save $85

Compare to Summit Racing SUM-918045 $149.99
ITEM 62234/61917 shown

Use Online & In-Store

36773857 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

MADDOX ★★★★★ (1048)

Ball Joint Service Kit for 2WD and 4WD Vehicles

$59.99 ~~$89.99~~

Save $99

Compare to Powerbuilt 940579 $158.99
ITEM 63279 64399/63610 shown

Use Online & In-Store

36781164 LIMIT 2 - Exp. 9/24/20*

SUPER COUPON

CENTRAL PNEUMATIC ★★★★★ (2453)

20 oz. HVLP Gravity Feed Air Spray Gun

$9.99 ~~$15.99~~

Save 80%

Compare to Husky H4840GHVSG $49.98
ITEM 67181 62300/47016 shown

Use Online & In-Store

36793552 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

ZURICH ★★★★★ (814)

OBD2 Code Reader with ABS/SRS/ FixAssist® ZR13

$149.99 ~~$179.99~~

Save $188

Compare to Snap-on Blue-Point EECR3A $338
ITEM 63806

Use Online & In-Store

36801858 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH ★★★★★ (1383)

LIFETIME WARRANTY

9 Piece Fully Polished Combination Wrench Sets

YOUR CHOICE
$5.99 ~~$7.99~~

Item 42304 shown

Save 66%

TYPE	ITEM
SAE	69043/63282/42304
METRIC	69044/63171/42305

Compare to Husky HCW10PCSAE $17.97

Use Online & In-Store

36810226 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

CENTRAL PNEUMATIC ★★★★★ (250)

6" Self-Vacuuming Palm Air Sander

$19.99 ~~$29.99~~

Save 66%

Compare to Powermate 0240181CT $59.99
ITEM 60628 98895 shown

Use Online & In-Store

36817960 LIMIT 3 - Exp. 9/24/20*

SUPER COUPON

CENTRAL PNEUMATIC ★★★★★ (3811)

3 Gallon, 100 PSI Oil-Free Air Compressors

YOUR CHOICE
$39.99

Hot Dog
ITEM 69269 97080 shown

Pancake
ITEM 61615/60637 95275 shown

~~$54.99~~

Save 59%

Compare to Porter-Cable PCFP02003 $98.62

Use Online & In-Store

36818334 LIMIT 3 - Exp. 9/24/20*

SUPER COUPON

WARRIOR ★★★★★ (3687)

4-1/2" Cut-Off Wheels for Metal - Pack of 10

$5.99 ~~$8.35~~

Save 70%

ITEM 61195/45430 shown

Compare to Diablo DBD045063710F $19.97

Use Online & In-Store

36830978 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

CHICAGO ELECTRIC WELDING ★★★★★ (1158)

Adjustable Steel Welding Table

350 LB. CAPACITY

$54.99 ~~$69.99~~

Save $85

32-7/8" 19-7/8" 30"

Compare to Strong Hand Tools TS3020 $139.99
ITEM 63069/61369 shown

Use Online & In-Store

36833284 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH AUTOMOTIVE ★★★★★ (2137)

• 300 lb. capacity

Low-Profile Creeper

$19.99 ~~$29.99~~

Save 55%

40" 19"

Compare to Power Torque GM40300 $44.99
ITEM 63371/63424 64169/63372 shown

Use Online & In-Store

36834785 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

PITTSBURGH ★★★★★ (1817)

4" Ratcheting Bar Clamp/Spreader

LIFETIME WARRANTY

99¢ ~~$1.99~~

Save 84%

Compare to Irwin 1964747 $6.49
ITEM 46805/62242 68974 shown

Use Online & In-Store

36836231 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

CENTRAL MACHINERY ★★★★★ (82)

English Wheel Kit with Stand

$249.99 ~~$319.99~~

Save $250

Compare to Eastwood 14156 $499.99

Use Online & In-Store

ITEM 68385

36856134 LIMIT 1 - Exp. 9/24/20*

SUPER COUPON

VOYAGER ★★★★★ (4184)

12" Tool Bag with 21 Pockets

$4.99 ~~$8.99~~

Save 75%

Tools sold separately.

Compare to AWP 3L-2216 $19.98
ITEM 38168/62163 62349/61467 shown

Use Online & In-Store

36857121 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

Haul Master ★★★★★ (2131)

1000 lb. Capacity Swing-Back Bolt-On Trailer Jack

$18.99 ~~$26.99~~

Save 62%

Compare to Reese Towpower 74410 $49.99
ITEM 69780/41005 shown

Use Online & In-Store

36866842 LIMIT 4 - Exp. 9/24/20*

SUPER COUPON

CENTRAL MACHINERY ★★★★★ (2478)

4" x 36" Belt/ 6" Disc Sander

$64.99 ~~$74.99~~

Save $84

Compare to Ryobi BD4601G $149
ITEM 5154/64778 97181 shown

Use Online & In-Store

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The Lokar Street Rodder Road Tour '34 Ford Build Continues

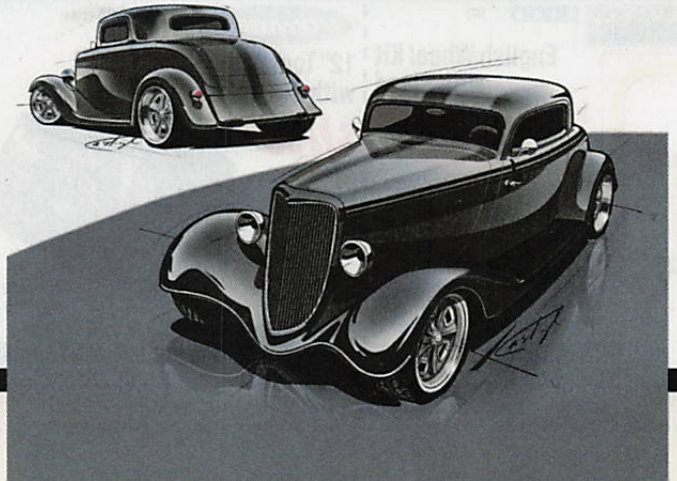
Precision Hot Rods Builds A Three-Window Coupe For the 2020 Road Tour

Ron Ceridono Precision Hot Rods &Fabrication

In the first installment of the build of this 1934 Ford Coupe for the 2020 Lokar Street Rodder Road Tour, Precision Hot Rods and Fabrication, in Macedonia, Ohio, began construction of the new car by custom-building the frame, supports, and crossmembers. They added front suspension components from Pete & Jake's along with a Flaming River steering box. In the rear is a Pete & Jake's triangulated four-bar locating a John's Industries 9-inch Ford axle housing with QA1 coilovers.

Now, with the chassis completed and the Ford Windsor small-block and Gearstar transmission mounted, it was time to drop the body in place. Redneck's '34 Ford body comes with a host of standard features, and the doors are hung with DOT safety latches and adjustable strikers.

Dozens of hours were spent fitting a 1933 Ford grille, plus the 1934's hood, fenders, and running boards. The door latches were installed along with the windshield wipers, the dashboard and gas tank cover were modified, and a thousand other tasks were seen to. The next step will be to completely disassemble the coupe and begin the painstaking process of final bodywork, paint, upholstery, wiring and all the other details it takes to make our coupe Road Tour worthy. HR

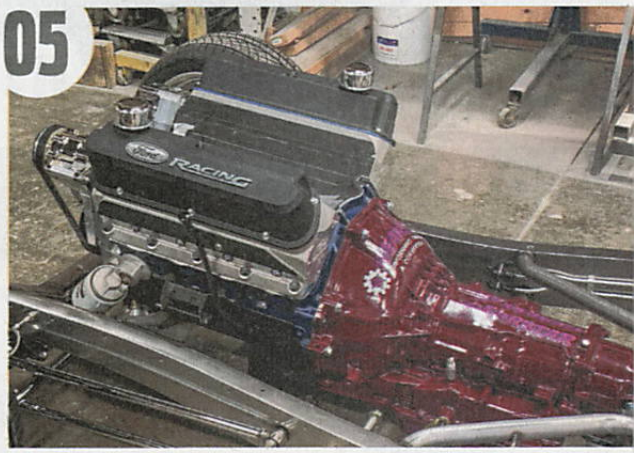


01

02

03

04



05

01 To provide clearance for the wide tires to come, Precision narrowed the rear of the framerails 2½ inches on each side. The 2¼ inch C-notches provides axle clearance.

02 The brakes are from Wilwood, with front and rear discs and four-piston calipers providing the stopping power.

03 Wilwood's master cylinder will use remotely-mounted reservoirs on the firewall. There are inline residual pressure valves in the front and rear brake lines; the rear line also includes a proportioning valve.

04 The coupe will roll on Billet Specialties' new Crossover wheels, 18x7 up front and 20x10 in the rear, wrapped with Continental 215/40ZR-18 and 295/45ZR-20 tires.

05 Powering the 2020 Road Tour version of the first road tour car is a 427 cubic inch Ford Windsor small-block. Backing up the 535 hp crate engine is a Gearstar Level IV 4R70W automatic overdrive transmission.

Sources

Alumicraft; 814.742.7405

Billet Specialties; 800.245.5382; billetspecialties.com

Dakota Digital; 800.852.3228; dakotadigital.com

Flaming River; 800-648-8022; flamingriver.com

Gearstar Transmissions; 330.434.5216; gearstar.com

Lokar Performance Products; 877.469.7440; lokar.com

Pete & Jakes; 816.758.4504; peteandjakes.com

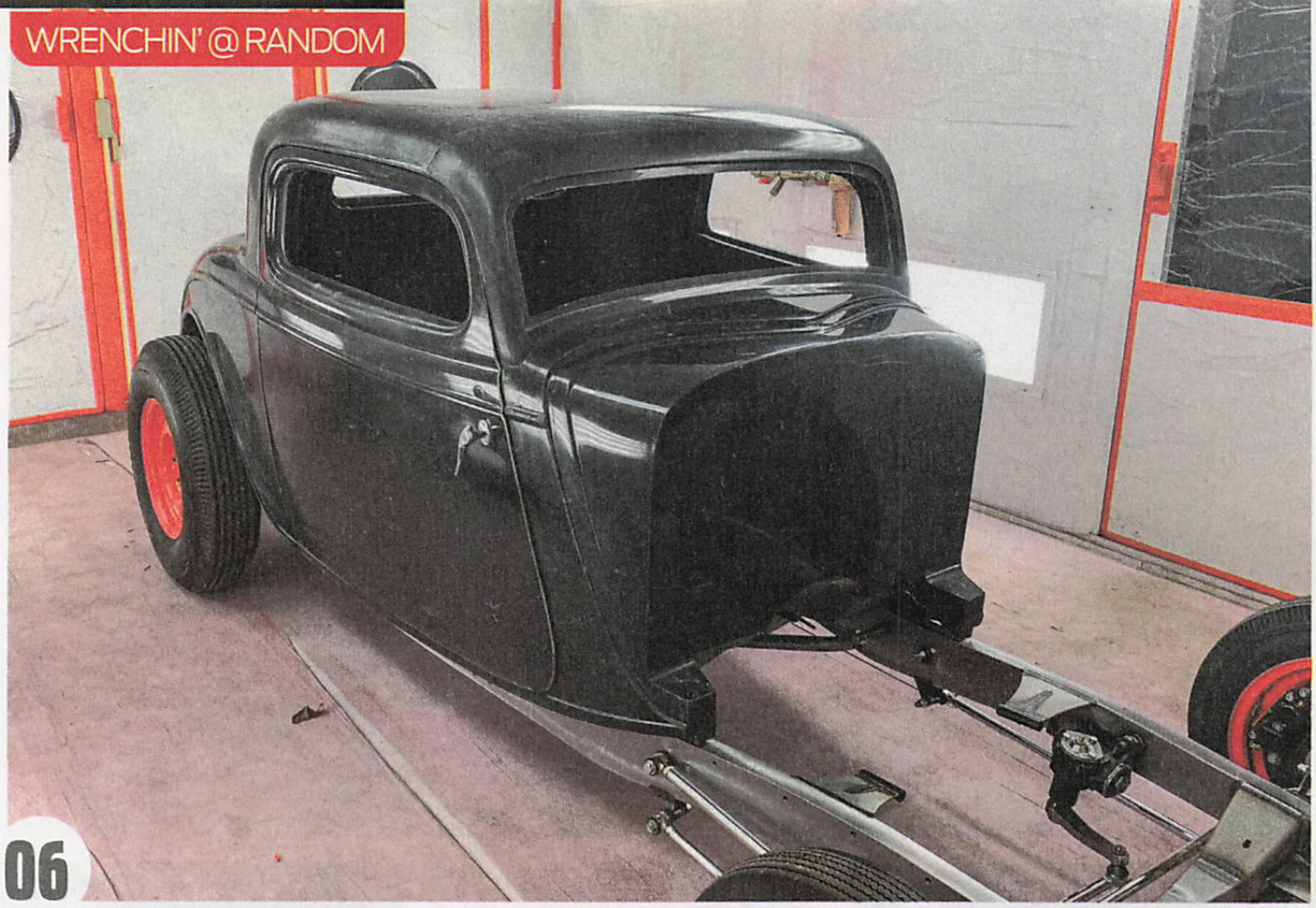
Precision Hot Rods & Fabrication; 330.908.0234; precisionhotrodsandfab.com

Redneck Street Rods; 605.353.1555; redneckstreetrods.com

Specialty Power Windows; 478.994.9248; spwkits.com

Vintage Air; 800.862.6658; vintageair.com

Wilwood; 805.388.1188; wilwood.com



06

07

06 Redneck's '34 body comes with a 2 5/8-inch chop, the roof and cowl vent are filled, a smooth or stock dash is available—both come with defroster ducts, and the doors are hung with DOT safety latches with adjustable strikers.

07 The original-style '34 dash will be fitted with Dakota Digital instruments. Precision fabricated a lower dash extension to house the Vintage Air controls and A/C outlets.

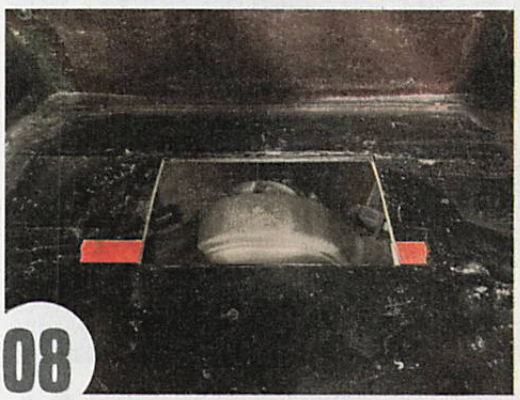
08 A hole was cut in the trunk floor to provide room for rear axle travel.

09 To enclose the modified trunk floor, a raised center section was fabricated from fiberglass.

10 To make sure our coupe's doors don't come open and fly off the hinges at the worst possible time, Precision installed manually operated safety latches.

11 Road Tour cars encounter all kinds of weather, so our coupe is equipped with windshield wipers from Specialty Power Windows. The motor and gear housing for the cable operated system mount at the back of the passenger compartment.

09



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11

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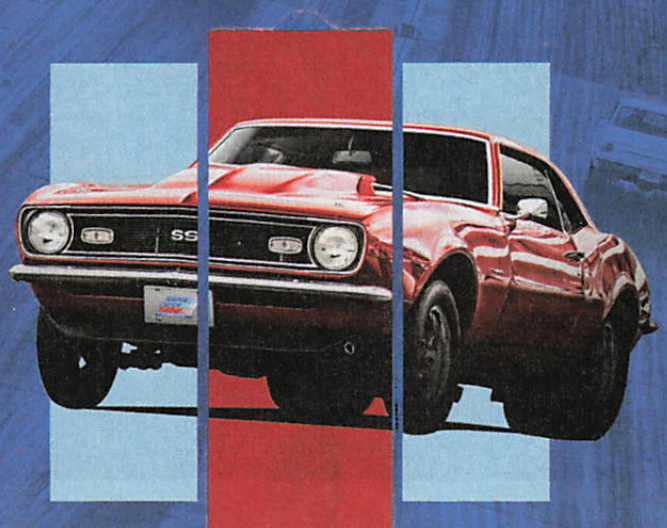

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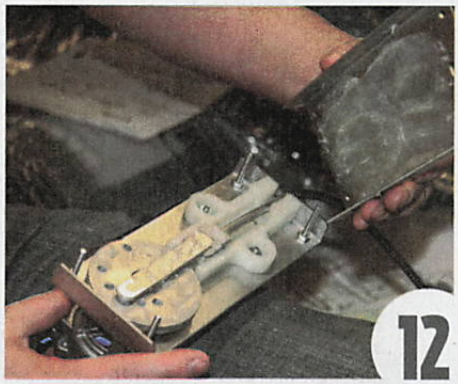
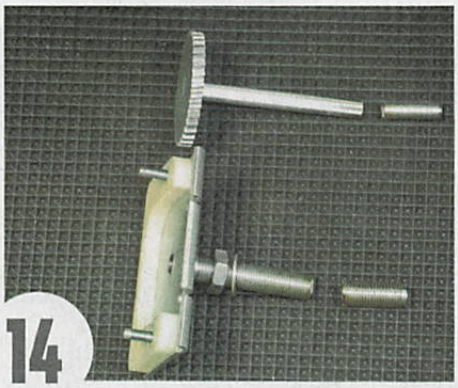




12 Inside the wiper motor housing is a rotating wheel that moves the drive cable back and forth. Multiple cable connection points allow the sweep of the wipers to be adjusted from 90 degrees to 160 degrees in 10-degree increments.

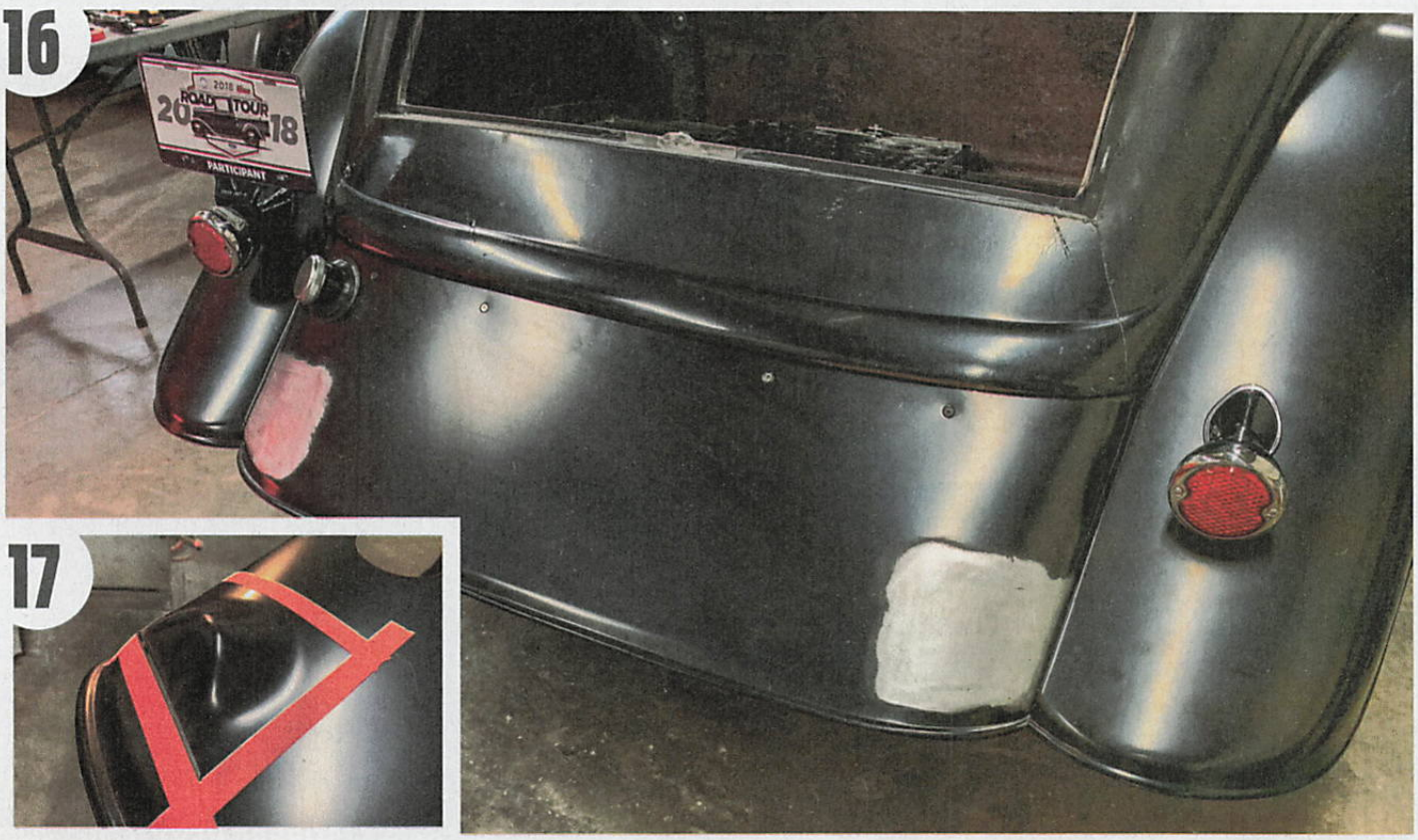
13 Truly a universal system, wiper shafts can be mounted above or below the windshield. The drive cable passes through the first housing to drive the second wiper assembly.

14 Inside the wiper-shaft housing is a gear that meshes with the drive cable. The wiper shaft turns as the cable travels back and forth.

15 The SPW wiper shafts accept arms that fit 1/2-inch fine spline knurls or arms that fit 1/4-inch shafts. Wipe kits are available with a two-speed intermittent self-park switch or a standard two-speed self-park switch.

16 To clean up the rear of the coupe it will run sans bumpers, so the bumper-bracket blisters in the steel gas tank cover were eliminated.

17 Precision cut out the blisters and filled in the resulting holes. The LED taillights from United Pacific mount on shortened original-style stands.



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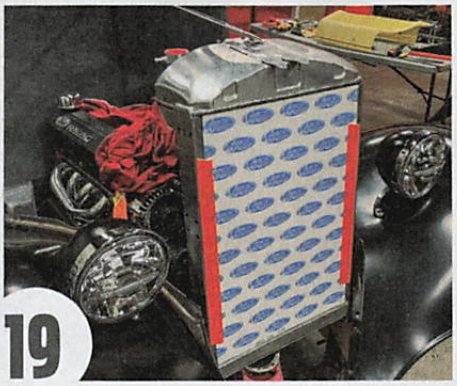

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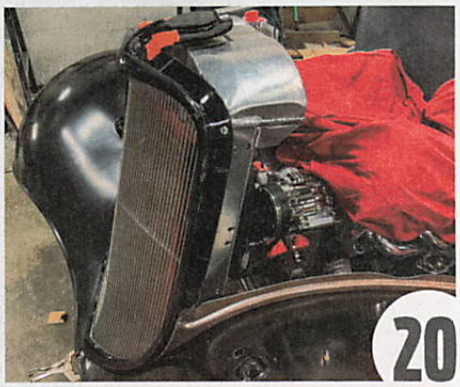

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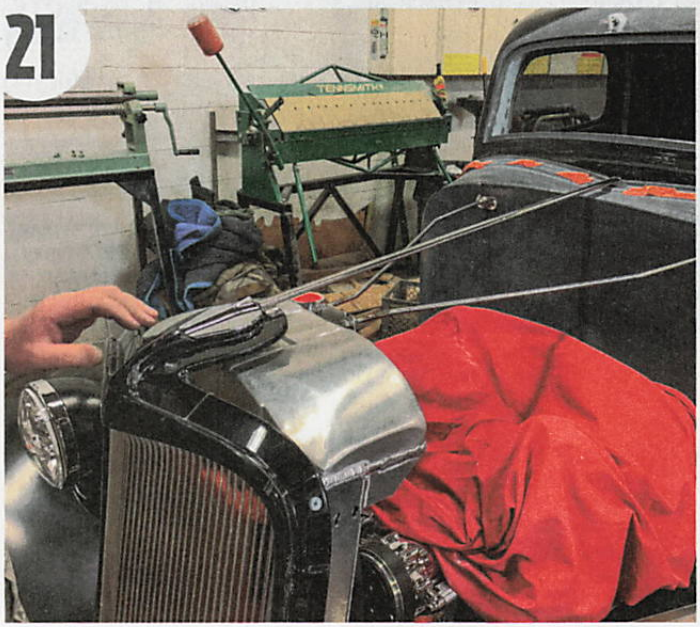

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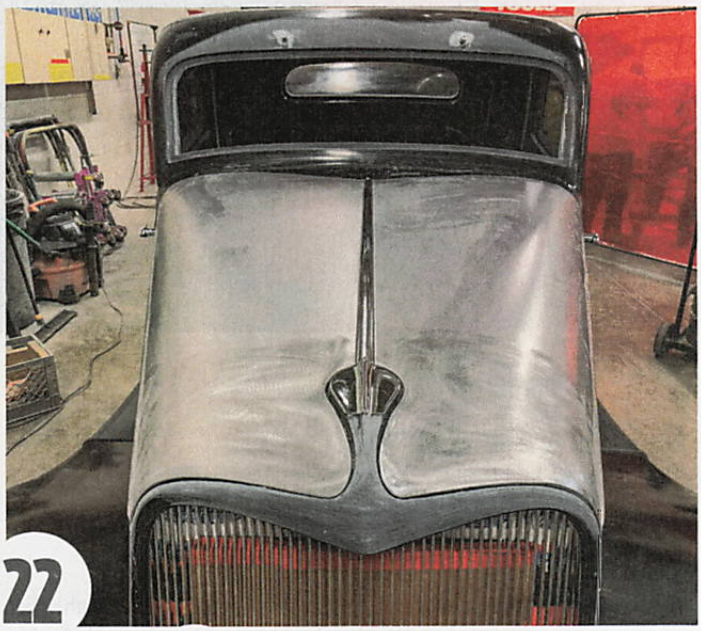

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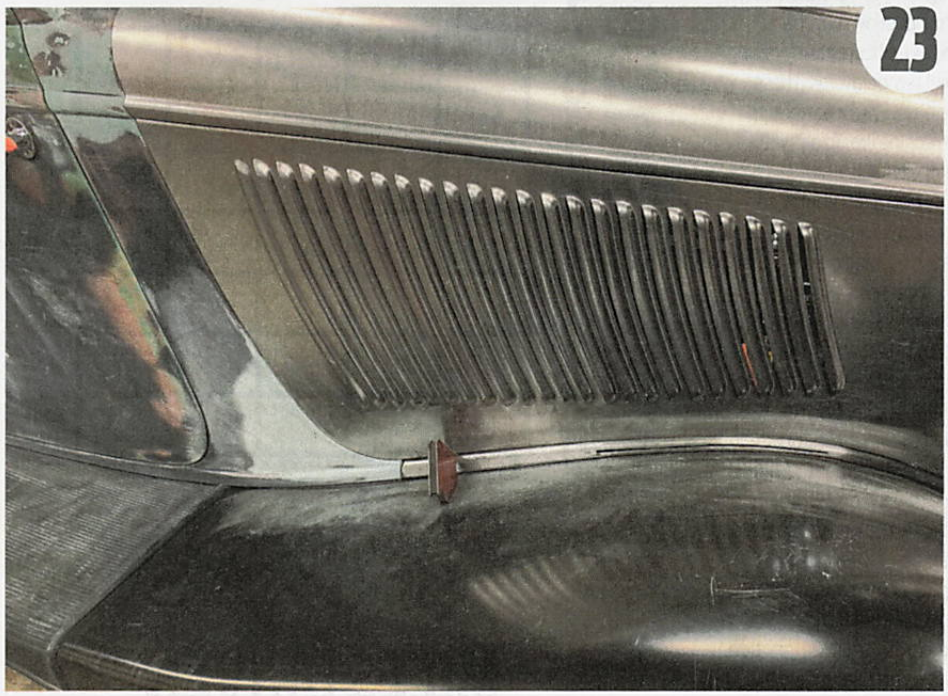


23

18 Precision is known for adding subtle details to their builds such as the notches in the tank cover for the Flowmaster stainless steel exhaust tips.

19 U.S. Radiator supplied the aluminum radiator and electric fan. One of the challenges when aligning the front sheetmetal on a Model 40 is that the grille shell mounts to the radiator.

20 It takes time and patience to position the grille shell and radiator to make the hood fit properly. Alumicraft supplied the grille shell and insert.

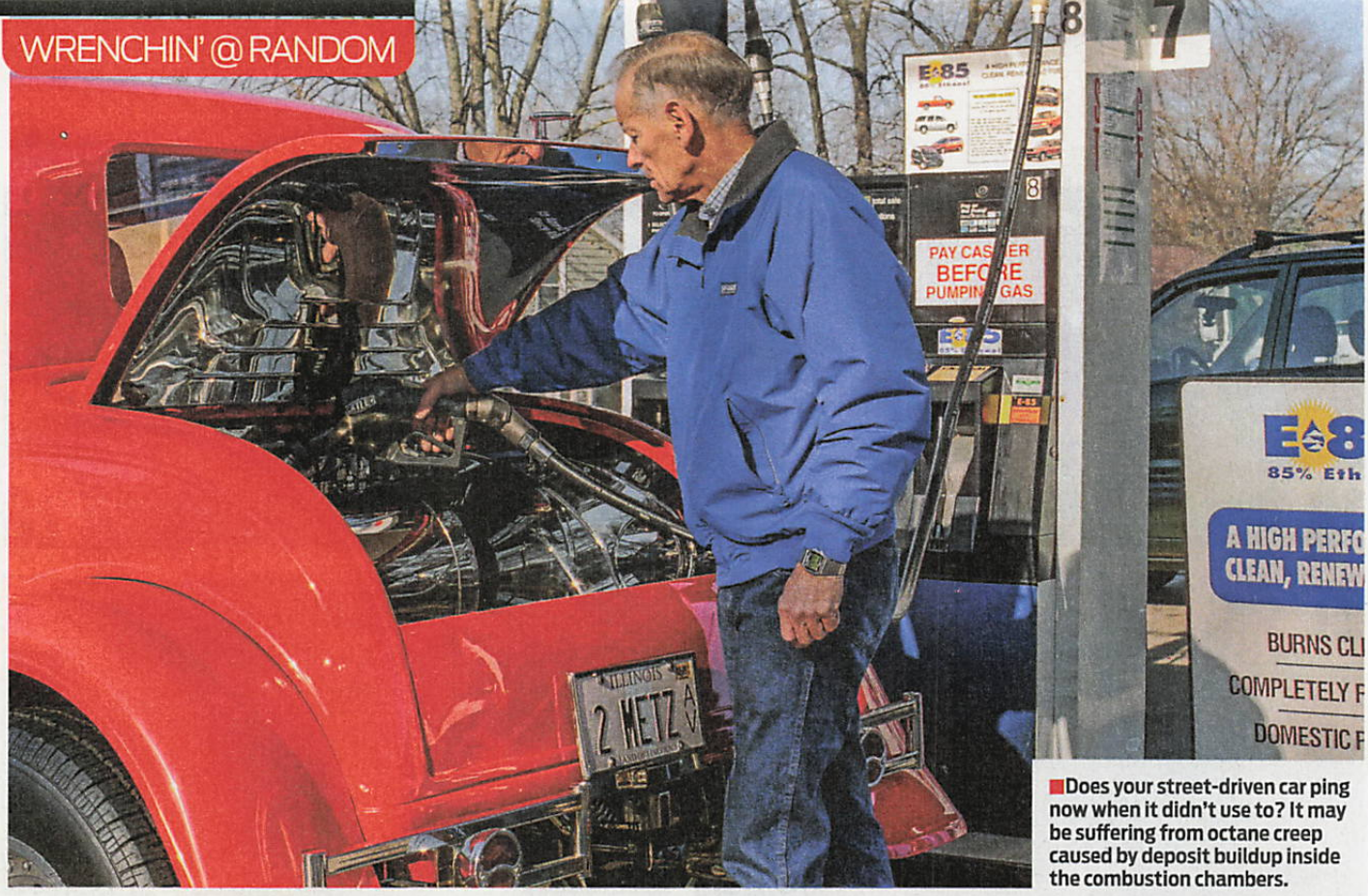
21 The adjustable braces from the radiator to the firewall are also used to align the hood with the grille shell and cowl. The piece between the braces is the center strip for the top hood hinge.

22 This is how the hood should fit. In some extreme cases it's necessary to trim the edges of the hood panels or add metal to them to establish the proper gaps.

23 While '33 and '34 Fords appear to be very similar, there were more than 100 differences between them. Case in point: '33 hood louvers were curved, while '34s were straight.

Coming Up Next

It seems a shame, but now it's time to blow the coupe apart for paint, powdercoating, and chrome plating. Early Ford aficionados will recognize the grille shell as a '33, as it's curved top-to-bottom, while '34s had fewer, straighter bars with a wider surround.



HOT ROD Archive

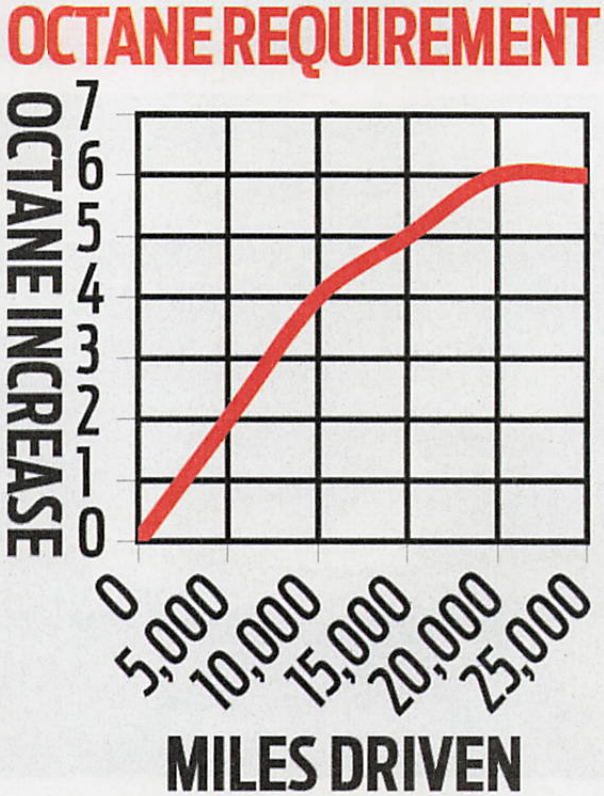
Does your street-driven car ping now when it didn't use to? It may be suffering from octane creep caused by deposit buildup inside the combustion chambers.

What Is Octane Creep?

New engines on the dyno and regularly refreshed race engines run OK with higher static compression ratios compared to otherwise similar, regularly driven, identically-fueled street engines. As miles pile up on a street engine, combustion chambers accumulate deposits that increase the engine's need for higher-octane gas by raising the effective compression ratio as well as inner cylinder-wall temperatures. These deposits cause audible spark "pinging" or "knocking" to increase. Engineers refer to this syndrome as "octane creep." Severe knock can shorten engine life. To a point, slower-burning, higher-octane gas reduces audible spark knock.

Octane creep is more readily apparent on an old engine with a distributor and carburetor, but it also affects late-model, electronically managed, computer-controlled EFI engines. You just aren't as aware of it because the engine computer crutches the problem for a while by retarding ignition advance when the knock sensor "hears" the engine pinging. But retarded timing means the engine won't make as much power as it used to. Causes of spark knock may be due to detonation, preignition, or a combination of both. Preignition is the spontaneous ignition of the air/fuel charge *before* ignition spark occurs. Preignition results from localized hot spots, including very hot carbon particles adhering to the piston top, combustion chamber surfaces, or valve heads, as well as due to overheated spark plug electrodes. Preignition is technically not the same as detonation, which is autoignition of the end gas that hasn't yet been consumed by the normal spark-plug-initiated flame travel *after* the spark plug fires. Under detonation, compression of the residual end gas by expansion of the burned part of the charge raises its temperature and pressure to the point that it spontaneously autoignites.

Although technically different, pre-spark preignition and post-spark detonation do sound similar. In severe cases, preignition and detonation can feed off each other, creating an ever-increasing spiral that leads to engine destruction. Ways to minimize this problem include polishing the combustion chamber and piston top, thermal barrier coatings, and periodically cleaning out the deposit buildup with upper engine and fuel injector cleaners like GM's Top Engine Cleaner (GM PN 88861803 or ACDelco X66P). **Marlan Davis**



On average, a new engine's octane requirement jumps as much as four numbers in the first 10,000 miles and then tapers off between 15,000 and 20,000 miles. Assuming normal maintenance, it remains relatively constant until the piston rings and valve guides wear enough to let oil into the combustion cavity.

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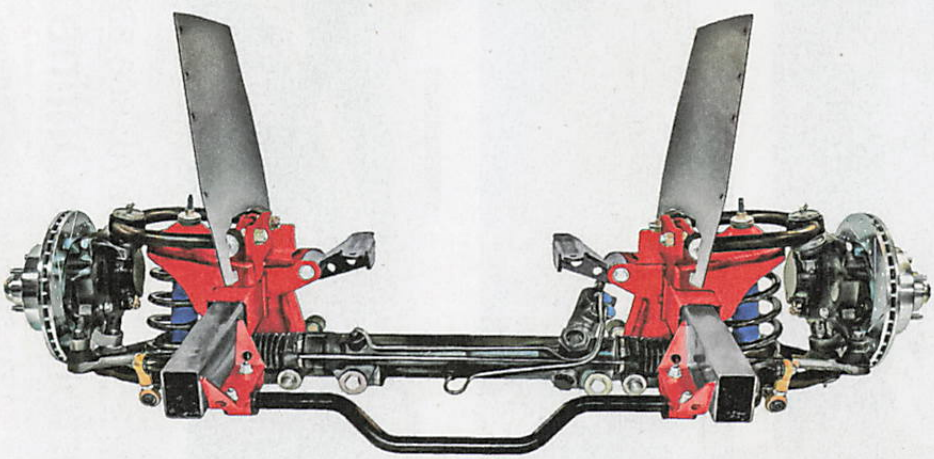
M. "Redharry" Mecstroth from Arizona Asks ...

What Common Mistakes are Made Swapping a Ford 5.0L Fuel-Injected Windsor V8 into Older Ford Muscle Cars?

Marlan Davis

Q: **I just bought** a 1987 Grand Marquis with 48,000 miles for cheap! I plan on putting the 5.0 engine and AOD trans in my 1962 Comet. I will be using the TCI [Total Coast Involved] frontend and already have an 8.8 rearend with 3.55s. [*See* "TCI Suspension Upgrade—Get a Handle on It" *on HOTROD.com for a complete TCI IFS early Falcon installation. —Editor.*] What are the main mistakes made when doing a swap like this? Also, (plug ears) I would like to get rid of all emissions stuff without ruining the engine.



Total Cost Involved

Total Cost Involved independent front suspension for early Comets, Falcons, and Rancheros (complete basic kit, PN 227-2352-00) eliminates the high shock towers and adds rack-and-pinion steering. It requires late-model double-hump oil pans and provides plenty of room for proper inlet ducting if running a MAF meter. TCI also sells IFS kits for old Mustangs, GM and Mopar iron, and street rods.

A: Excellent question, Redharry. There are at least 25 mistakes or fallacies commonly made when retrofitting mid-'80s to mid-'90s Ford 302 EFI V8 engines into earlier Ford muscle cars, including "wives' tales" that some think are mistakes but really aren't. For a real-world fix-it on a 5.0L-HO Ford SFI engine swap into a '77 Mustang with many of the errors discussed here, see our online article from 2015: "HOT ROD to the Rescue—This Late-Model 5.0L SFI System Runs Terribly."

With the help of Ford EFI expert Mark Sanchez (Advanced Engineering West/AEW), I'll answer your question generically, as well as provide some specifics for your swap. For reference, your 1987 Mercury Grand Marquis 5.0L Windsor V8 is a sequential fuel-injection (SFI) non-HO engine that uses Speed Density metering: The car's electronic control unit (ECU) has preprogrammed fuel and spark tables referenced to a MAP sensor that reads engine vacuum. Your engine does not have a mass airflow (MAF) meter in the inlet duct, which measures actual airflow through the inlet duct to help the ECU determine the right amounts of fuel, air, and spark advance.

It helps to have the service manual and wiring

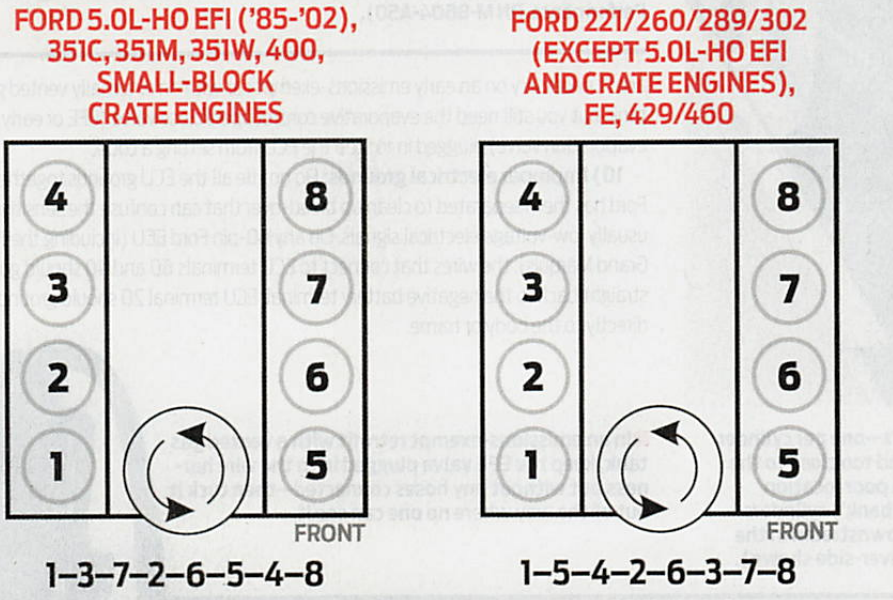
ASK MARLAN A TECH QUESTION: PITSTOP@HotRod.com

Please provide a daytime phone number so we can contact you for more information if necessary. Questions will be answered in the print edition or on HotRod.com.

Left: A typical Ford 5.0L V8 SFI engine in a 1988 Mustang with the stock Speed Density-based air/fuel metering system. Mass Air metering came in on 1988 California 5.0L HO cars and went nationwide in 1989. Mecstroth's 1987 Speed Density-based 5.0L Grand Marquis would look similar under the hood, except his non-HO engine has a different firing order.

diagram for both the donor vehicle and the receiver vehicle. To make the swap as painless as possible, the drivetrain, computer, and wiring harness should all come from the same donor. Unless otherwise stated, we'll assume the use of a Ford OE factory engine management system. When that might present a problem meeting your needs, we will also present alternatives. OK, onto the potential "gotchas."

1) Mismatching the ECU and engine firing order: To avoid computer electrical terminal repinning and rewiring, or costly parts swaps; if using the factory ECU, it must be compatible with (have the same firing order as) the engine's camshaft. Ford used two different firing orders on roller-cammed 5.0L Windsor fuel-injected engines: the "traditional" 289/302 firing order and the 5.0L-HO/351W firing order. Your 1987 Grand Marquis has a hydraulic roller cam and the traditional 1-5-4-2-6-3-7-8 firing order.



Ford numbers its cylinders consecutively down each bank, starting with No. 1 on the passenger side. Traditional 289/302 1-5-4-2-6-3-7-8 firing order applies to all 5.0/302 engines with flat-tappet cams. All 5.0L-HO roller-cam engines use the 351C/M/W's 1-3-7-2-6-5-4-8 order. Depending on model and year, roller-cam non-HO 5.0L V8s could have used either order.

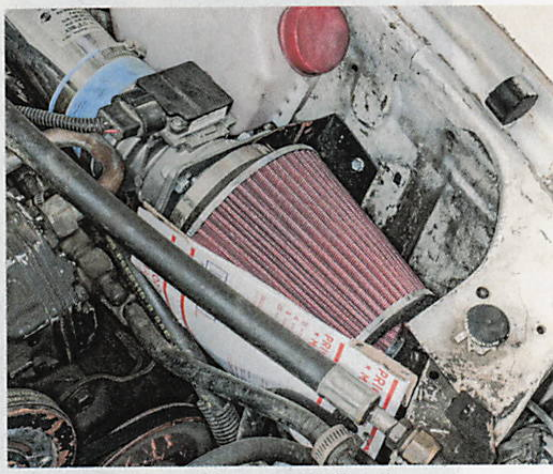
2) Mismatching the ECU fuel-injector firing sequence: Ford 5.0L (302) Windsor port fuel-injection cars fire the fuel injectors individually and sequentially according to the firing order (termed "SFI" or sequential-fire injection by Ford). Pickup trucks with port fuel-injection use a batch-fire system (half the injectors fire simultaneously). ECUs must be compatible with the injector firing mode.

3) Mismatching the ECU and transmission: Only the '94 and later AOD-E (the fully electronic successor to the original AOD) needs to work with a specific ECU. On the original AOD, the ECU does not control TCC (torque converter clutch) lockup or manage the shift points, so the AOD and other manual and automatic transmissions don't care where the computer came from. Even a legacy (pre-computer) trans like a C4, C6, Top Loader, or T10 works. But see Tips 11 and 12, below.

4) Mass air meter improperly installed or located (doesn't apply to 1987 Grand Marquis and other Speed Density vehicles): Factory MAF meter calibration assumes an original OE mounting location. The meter might not work properly if relocated. Bends immediately downstream or upstream from the MAF disturb airflow through the meter, resulting in an incorrect reading. If varying from the factory ducting and mounting location, a Ford OE MAF meter ideally needs about 10 inches of straight tubing on either side of it for optimal performance. The MAF should not butt up against the throttle body; the delay between actual airflow through the meter versus the amount of throttle opening in the throttle body may confuse the signal to the ECU. Don't butt a stock MAF meter up against the back of the air filter, either. Recalibrated aftermarket meter/air filter combo "teams," which are specifically designed to work as a unit, are available (Pro-M is one source). Because of possible turbulence that can result in an incorrect reading, don't locate the meter directly in the cooling fan path.

5) The engine won't run properly without catalytic converters (partial fallacy): All Ford SFI V8 engines have dual exhaust, one pipe for each bank of cylinders. Each bank has its own narrowband oxygen (O_2) sensor, located ahead of the catalytic converter(s). On some cars, the dual pipes merge to go through a single catalytic converter; others have a full dual exhaust system with dual converters. You can remove the converter(s) without affecting system operation or driveability in an emissions-exempt application that uses the OBD-1 Ford engine management system (basically anything prior to 1996 with the 60-pin ECU; OBD-2 systems have a larger 104-pin ECU). The 60-pin ECU won't even throw a code.

6) Incorrect O_2 sensor location or installation: With or without the converter(s), the OE system still requires an O_2 sensor on each bank, mounted as close as possible to the original stock position. The O_2 sensor needs to sample the average oxygen content of that entire bank, so if fabricating a custom exhaust, install the sensor in each bank's common collector or pipe no more than 3 inches downstream from the pipe's merge point. As Sanchez puts it, "O_2 sensors work off heat. Anything more than 3 inches and the pipe becomes too cool. If the exhaust is too cold, the sensor always causes the computer to command an overly rich fuel mixture."



Don't install a stock factory MAF directly against the air filter unless it's a recalibrated aftermarket MAF/filter "team." Here, this MAF is also too close to the fan and radiator. "When the MAF sensor gets a bad signal from the air," explains Sanchez, "it causes turbulence. The flow isn't smooth, so it gets a bad reading." On this car, its meter read lean. A cardboard shield temporarily fixed the problem; later, the owner fabricated a permanent aluminum baffle.

7) Removing the "smog" (Thermactor) pump and related valves: This belt-driven air pump adds air to the exhaust. On a cold start, it injects air ahead of the OBD-1 system's O_2 sensor mounted upstream (before) the stock setup's catalytic converter. With the extra injected air, the O_2 sensor reports a "lean" mixture to the ECU, which then commands additional fuel enrichment for the first 30 seconds of engine operation (it's the electronic version of a carburetor choke). Without the additional smog pump-supplied air,

Sources

Advanced Engineering West (AEW); Mira Loma, CA; 626.222.4648; AEWperformance@aol.com

Aeromotive Inc.; Lenexa, KS; 913.647.7300; AeromotiveInc.com

California Pony Cars (CPC); Ontario, CA; 888.225.7669 or 909.923.2804; CalPonyCars.com

Duralast Parts; Duralastparts.com

Ford & Motorcraft Genuine Service Parts; Dearborn, MI; 844.589.0060; Parts.Ford.com

Ford Performance Parts; Dearborn, MI; 800.FORD788 or 313.621.0771; PerformanceParts.Ford.com/

Holley Performance Products; Bowling Green, KY; 800.HOLLEY1 (nearest dealer), 866.464.6553 (tech), or 270.782.2900 (general); Holley.com

Performance Automatic; Frederick, MD; 240.439.4650; PerformanceAutomatic.com

Pro-M Racing Inc.; W. Brookfield, MA (shipping) or Summerfield, NC (sales & tech); 336.644.8668; ProMRacing.com

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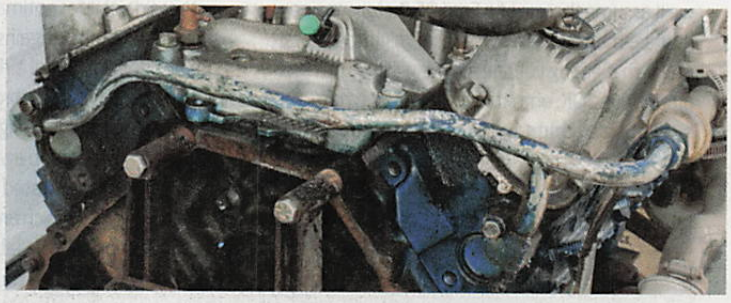
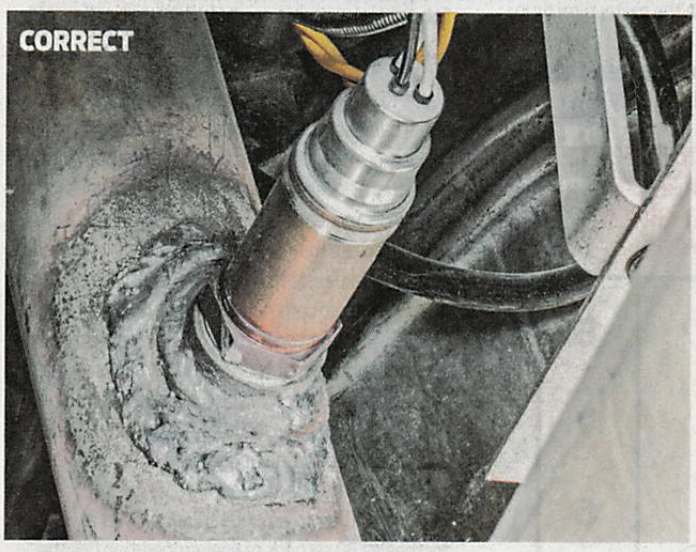


■ **Thermactor tubes bolt to the rear of late-model cylinder heads. To prevent an exhaust leak out the back of the heads if not using the tubes, plug the passage holes with Ford's blind-threaded insert kit (PN F4ZZ-6E086-A). Aftermarket, off-road-only air pump eliminator idler brackets for the serpentine-drive system are available from several sources (including Ford Performance, PN M-8604-A50).**



■ **Ford 5.0L EFI V8 factory installs use two O_2 sensors—one per cylinder bank. On this retrofit, they were too far upstream and too close to the heads (driver-side shown). Besides running hot, the poor location prevents accurately sampling the average of all the bank's cylinders. Sanchez relocated the sensor mounting locations downstream in the common exhaust pipe after the collector-merge (driver-side shown).**

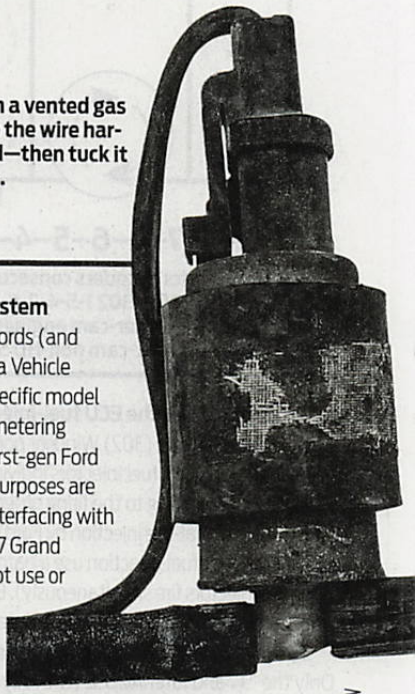
the O_2 sensor won't read lean—which means the ECU won't order additional enrichment, causing a cold engine to stall. As the engine warms up, based on ECU input from air and coolant temperature sensors, a valve switches the air injection to a port downstream from the O_2 sensor but still upstream from the converter, which keeps the converter hot or "lit off." With the O_2 sensor no longer seeing additional air, it reports a normal "stoichiometric" A/F ratio (about 14.7:1 at hot idle or cruise). In an emissions-exempt application using the OE Ford engine management system, you can discard the smog pump only if *both* of the following are true: You're not running catalytic converters and never drive or start the car in ambient temperatures below 30 degrees. As for a smog pump's supposed detrimental effect on performance: Actual back-to-back dragstrip tests performed by Sanchez years ago show that, with no other changes, "a smog pump costs only one-tenth of 1 hp."

8) Removing the EGR valve: EGR removal raises NO_x (oxides of nitrogen emissions) and increases engine knock. The ECU thinks something's seriously wrong with a knocking engine, so it makes the air/fuel ratio one full point richer and retards the timing to "save" it. Either way, the car runs like crap.

9) The engine won't run right without an evaporative control system (partial fallacy): An evaporative emission control canister and return lines aren't necessary on an early emissions-exempt car with an externally vented gas tank, but you still need the evaporative control open/close valve (EFE or early fuel evaporation valve) plugged in to stop the ECU from setting a code.

10) Improper electrical grounds: Do not tie all the ECU grounds together. Ford has them separated to clean up bleed-over that can confuse the sensitive, usually low-voltage electrical signals. On any 60-pin Ford ECU (including the 1987 Grand Marquis), the wires that connect to ECU terminals 60 and 40 should go straight back to the negative battery terminal. ECU terminal 20 should ground directly to the body or frame.

■ **In an emissions-exempt retrofit with a vented gas tank, keep the EFE valve plugged in to the wire harness but without any hoses connected—then tuck it out of the way where no one can see it.**



Mark Sanchez/AEW

11) Not hooking up the VSS if the system requires one: All MAF-meter-equipped Fords (and many aftermarket EFI systems) must use a Vehicle Speed Sensor (VSS). Depending on the specific model year and options, Ford OE Speed Density metering systems may or may not need a VSS. On first-gen Ford EFI systems, if required, the VSS' primary purposes are preventing engine stall under braking or interfacing with the factory cruise control system. Your 1987 Grand Marquis' OE Speed Density system does not use or require a VSS if not running that model's original factory-installed cruise control.

12) NDS switch missing or not connected (automatic transmission): In gear, additional load imparted on the engine by the torque converter and trans cause an idle-speed drop. The NDS (Neutral Drive Switch) on the trans case detects whether the trans is in Neutral or in a drive gear. If the trans is in gear, it signals the ECU to increase engine idle airflow via the IAC (Idle Air Control) motor, preventing the engine from stalling. Automatics require a functional NDS.

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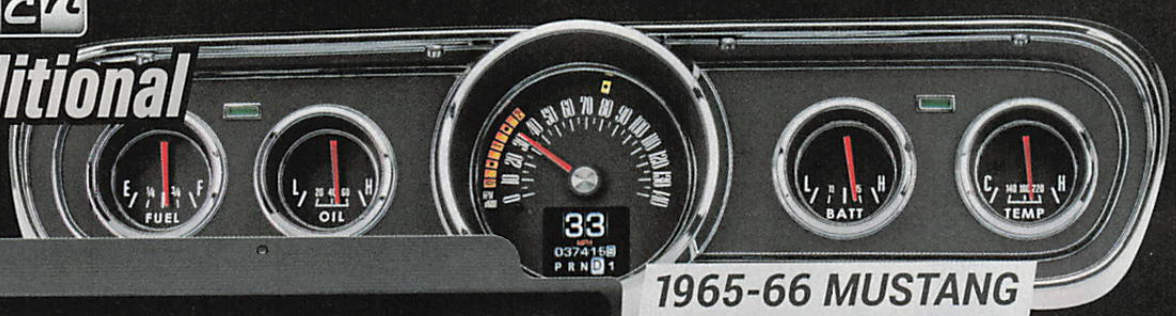

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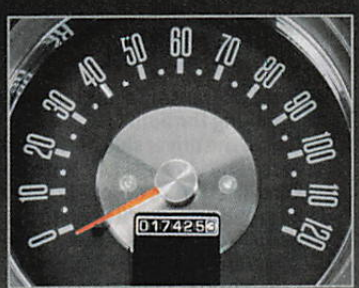

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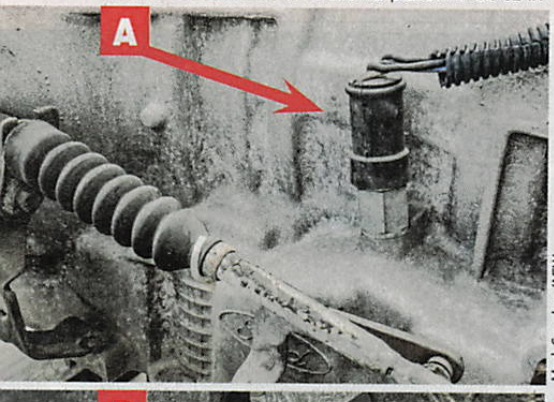
Need to run a VSS plus a cable-driven speedometer on a Ford? Use this piggyback VSS switch (Duralast PN SU1022 or equivalent). Stock on many Fords circa 1988–1993 (including Meckstroth's 1987 Ford AOD with factory cruise control), it even fits an old C4, screwing right into the existing speedometer cable hole.

13) Wrong flexplate and harmonic damper (wrong unbalance): All Ford small-blocks are externally balanced, but the amount of external unbalance on the 5.0L engines changed in late 1981. Early small-blocks (including the original Comet V8 260 or 289) had 28.2 oz-in unbalance. In late 1981, 302/5.0L V8s went to a 50 oz-in unbalance. The flexplate and front damper must have the correct amount of external unbalance for the engine. Out back, use the correct stock 164-tooth AOD auto trans flexplate with 50 oz-in unbalance if running a AOD. The starter must match the flexplate diameter, which is larger than most early C4 flexplates. The torque converter must also come from an AOD. Fifty oz-in flexplates are usually dual-drilled with both Ford torque converter bolt patterns. If you don't have the correct Grand Marquis flexplate, Performance Automatic is one source for an SFI-certified unit. It also carries correct 50 oz-in unbalance flexplates and compatible torque converters for legacy transmissions.

14) Early V-belt pulleys don't match balancer: If using an early three-bolt V-belt crank pulley instead of the late-model serpentine-belt drive system, you need to redrill the pulley to match the four-bolt pattern on the late 50 oz-in balancer. All early three-bolt balancers have a 28 oz-in unbalance, so they can't be used. It's possible to redrill the three-bolt pulley without machinist-level precision. If the holes end up slightly offset, it shouldn't result in a wobbly pulley because Ford has a tight pulley-to-balancer center index hole (it functions like a road wheel's center hub). Other alternatives: Find a four-bolt V-belt pulley (circa late 1960s through late 1970s) or buy an aftermarket 50 oz-in unbalance damper with the right pulley bolt pattern.

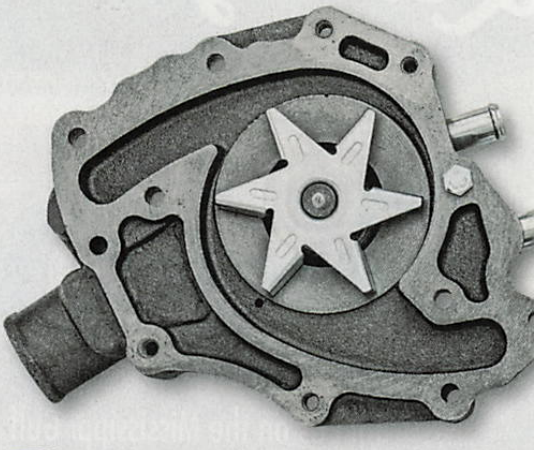
15) Water pump direction of rotation wrong: 5.0L Ford V8 serpentine beltdrives require a reverse-rotation water pump. V-belts require a standard-rotation water pump.

16) Wrong fan for water pump direction of rotation: If running a mechanical fan, the blade angles must be compatible with the water pump's direction of rotation.



Mark Sanchez/AEW

Automatic transmissions require an NDS when running the Ford ECU. On the AOD, it's located on the driver side of the main case above the shift linkage (*A*). With legacy transmissions like the C4, C6, or FMX that lack NDS switch provisions, you'll need to get creative. On this C4, Sanchez installed a generic single-pole, single-throw (SPST), normally open (NO) switch on the shift linkage (*B*) using a right-angle hardware store bracket. It closes in gear, signaling the ECU to raise engine speed by 150 rpm.

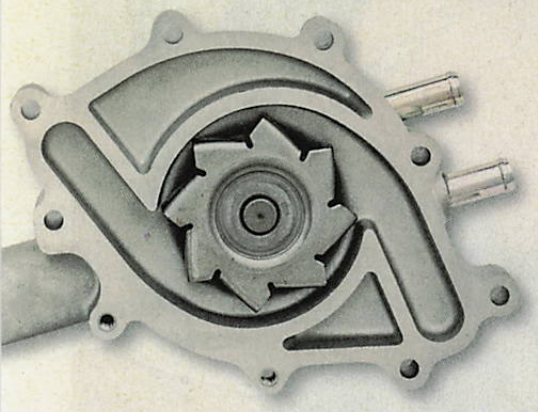


***Above and opposite:* Use a water pump matching the beltdrive system's rotational direction. If unsure, check the impeller: standard (clockwise) rotation (*left*), used with V-belts; reverse (counterclockwise) rotation (*right*), used with nearly all serpentine-belt setups. The pump at left is typical of most replacement standard-rotation water pumps; note the different backing plate bolt pattern compared to the late serpentine pump that prevents bolting on later serpentine-pump plates for greater front timing cover compatibility.**

17) Incompatible water pump and timing cover: Stock front timing covers must be compatible with the water pump type (standard- or reverse-rotation), the water pump-to-timing cover bolt pattern, and the pump's rear cover outlet hole shape versus the timing cover's inlet hole shape. Universal timing covers that accept many standard-rotation and reverse-rotation pumps are available from several sources, including California Pony Cars and Ford Performance Parts. Generally, if your water pump's rear cover has round outlet holes, it has broader front cover compatibility—or fab your own custom rear

Ford Performance Parts SFI 18-1 crankshaft damper for 1981 to 1993 302 50 oz-in unbalance engines has both three- and four-bolt pulley mounting patterns. A removable weight allows use with aftermarket internally balanced cranks. Various thickness spacers are available separately, as needed to correct belt alignment on the 3-inch overall-length damper.

Ford Performance Parts



cover out of steel or aluminum plate. For more information on water pump and timing cover compatibility, see "Pit Stop: Ford Small-Block V8 Front Cover and Water Pump Interchange" on the web.

18) Wrong driveshaft yoke: Use the Grand Marquis yoke; early 1960s yokes like the one from the stock Comet had a different yoke spline count. You'll have to shorten the driveshaft in any event to accommodate an AOD.

19) Changing rearend gears and/or tire sizes from OE configuration screws up the computer (fallacy): The computer couldn't care less on the first-generation Ford SFI systems, or with any Ford trans (including the AOD) that still uses drive and driven gears to calibrate the speedometer.

20) Wrong oil pan: Early cars with stock front suspension layouts require a front-sump pan, corresponding oil pump pickup tube and screen, and a front timing cover with a dipstick tube hole—but 1979 and later Fords came with double-hump pans. Normally, this requires swapping to the correct parts. However, your custom TCI frontend with rack-and-pinion steering is set up for the double-hump oil pan.

21) Lower radiator hose doesn't match original radiator: Late-model accessory drives are designed to work with a driver-side lower radiator hose. Your 1962 Comet radiator would have had a passenger-side lower hose. Make up a custom hose, or get a custom radiator with correct late-model lower radiator outlet.

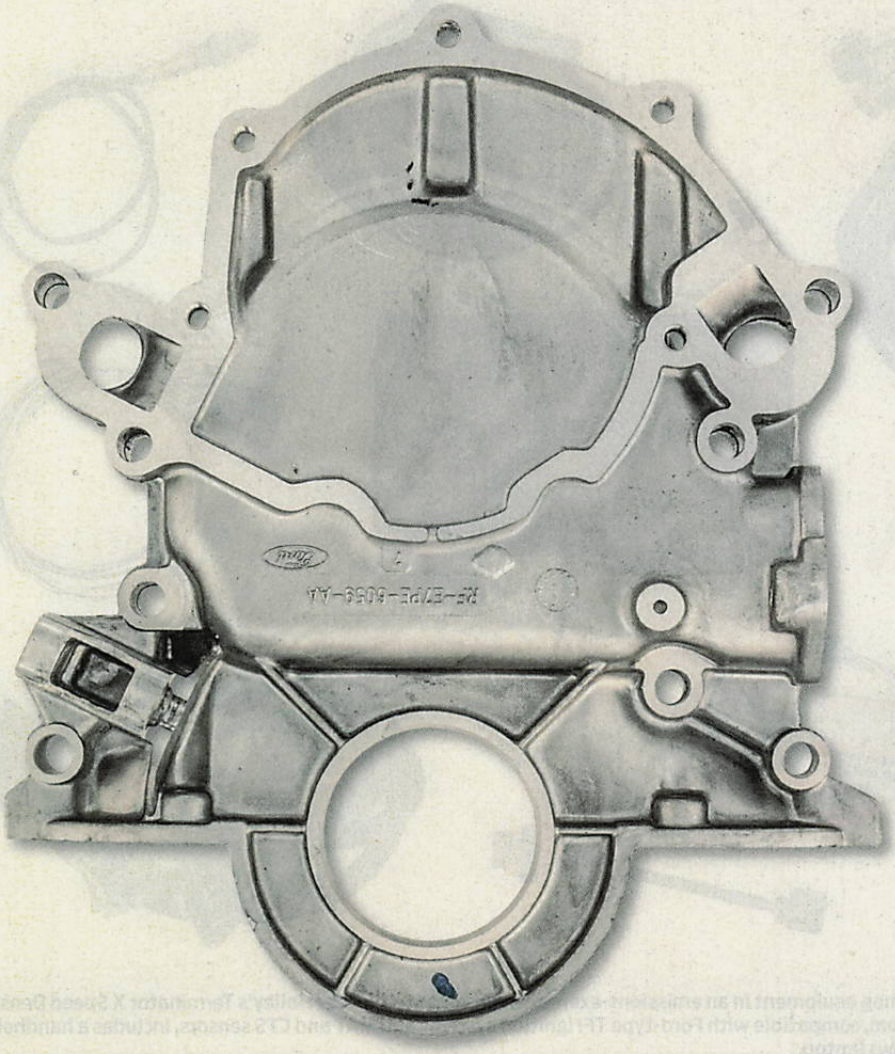
22) Wrong gas pedal: Not a deal-breaker, but that old vintage pedal and solid metal throttle linkage won't work with an EFI throttle body and late-style accelerator cable. Use your Grand Marquis' or a 1979 to 1993 Mustang pedal and throttle cable. The pedal bolts to the floor, so installation is relatively easy.

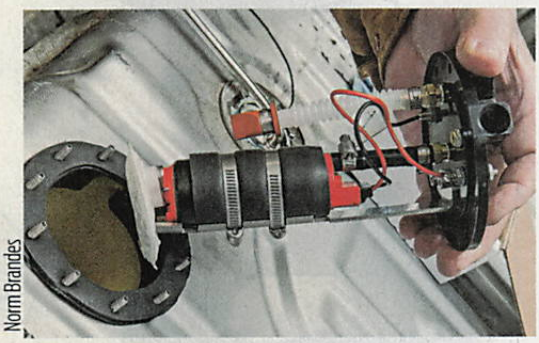
23) Failure to remove the ballast resistor wire: Your EFI motor needs a full 12 volts to run right. It won't get it if the old points ignition resistor wire located in the starter switch-to-distributor coil circuit is still in place. The non-resistor portion of the original wire is usually red with a green tracer; the ballast resistor portion is usually pink. It's generally easiest to run a whole new wire.

24) Gas tank not compatible with EFI: High-pressure fuel-injection systems require a constant fuel supply. The stock 1980s Ford SFI systems also need a return line. In-tank pumps are preferred; they run cooler and keep the fuel cooler. Pushing fuel is more efficient than sucking fuel. Old (non-EFI) fuel tanks don't have the sophisticated internal baffling necessary to prevent fuel slosh at low fuel levels under hard acceleration, braking, or cornering, which in an EFI application might cause momentary fuel starvation. There are four ways to solve this problem: Weld a sump at the bottom of the tank and use a noisy external fuel pump; install a fuel cell in the trunk; get a high-buck custom tank made; or install an affordable, modular Aeromotive Phantom fuel system inside the existing stock fuel tank. Alternatively, Aeromotive also offers affordable "plug-and-play" vehicle-specific Gen II Stealth fuel tanks that come completely assembled with the Phantom system already installed. For a story where a Phantom fuel module helped solve a 1968 Chevelle's fuel system-related drivability problems, search online for "The Fuel System in Greg Miller's '68 SS 396 Chevelle Runs Hot."

25) Wrong transmission mount: Early 1960s Ford transmissions still used trans mounts with an offset longitudinal mounting pattern. Like other Ford transmissions since the mid-1960s, the AOD uses modern-style transverse mounts with straight-across bolts. This may require crossmember modification, relocation, or even a complete custom crossmember.

This "universal" Ford Performance Parts front timing cover (PN M-6059-D351) works on most early and many late applications (with a compatible water pump and pump backing plate). It includes a front-sump oil pan dipstick hole, a mechanical fuel pump boss, and driver- and passenger-side timing tab mounts.





Norm Brandes

Modify your legacy fuel tank that lacks proper baffling or return-line provisions for EFI with Aeromotive's Phantom universal modular conversion kits, which come with the pump, pickup, inlet, return, vent, and unique baffling that—once you've drilled a new hole in the tank—permit dropping in the assembly as a unit.

In sum, although there are both mechanical and electronic issues on a swap like yours, aftermarket solutions are available—this is not a pioneering effort. Traditionally, the MAF meter-equipped 5.0L SFI engines are considered to be more modification friendly without needing major reprogramming, but that isn't necessarily so if dropping an otherwise stock engine into an early application and inlet duct modifications are needed to get the MAF meter to fit the new chassis (high shock tower interference on old stock Ford suspensions, for example). With an unmodified engine, it may be simpler to use a Speed Density engine-management system in a retrofit with limited clearance.

If you intend to heavily modify the engine, or really want to trashcan the "superfluous" smog equipment—such as the smog pump or EGR system—in an emissions-exempt application, I'd strongly consider using an easily reprogrammable aftermarket port fuel management system like Holley's Terminator X. Another alternative is a piggyback system for the factory ECU like those offered by SCT—but you'd be dependent on a third party for a custom tune. SCT doesn't officially support 1988 and earlier Ford computers anymore, and even when it did, custom one-off "tunes" were only available through licensed dealers. AEW's Sanchez can still hack some early factory ECUs in an emissions-exempt application, but he'd need the broadcast code off the Marquis' ECU sticker to know for sure.

Good luck, and send us some pics when it's done!

Norm Brandes

The key to making the Phantom system work in legacy fuel tanks is this unique baffle/basket sleeving that surrounds the pump. It prevents starving the fuel pump under aggressive driving conditions or at low fuel levels. The system fits any 6- to 11-inch deep fuel tank.

Holley

For modified engines or those wanting to delete smog equipment in an emissions-exempt environment, consider Holley's Terminator X Speed Density port fuel-injection system (PN 550-937F). This system, compatible with Ford-type TFI ignition systems and MAT and CTS sensors, includes a handheld LED calibration touch screen, or you can use a Windows laptop.

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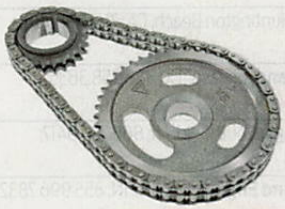

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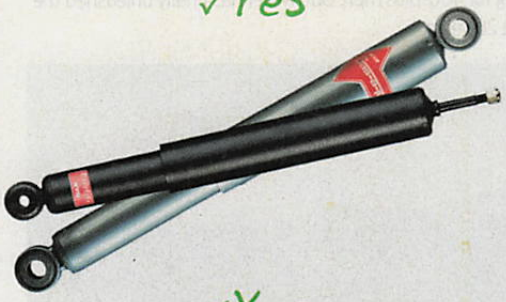

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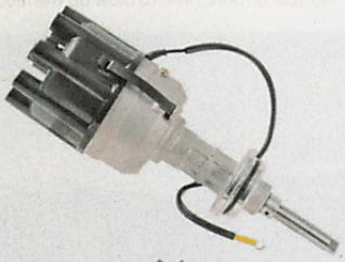

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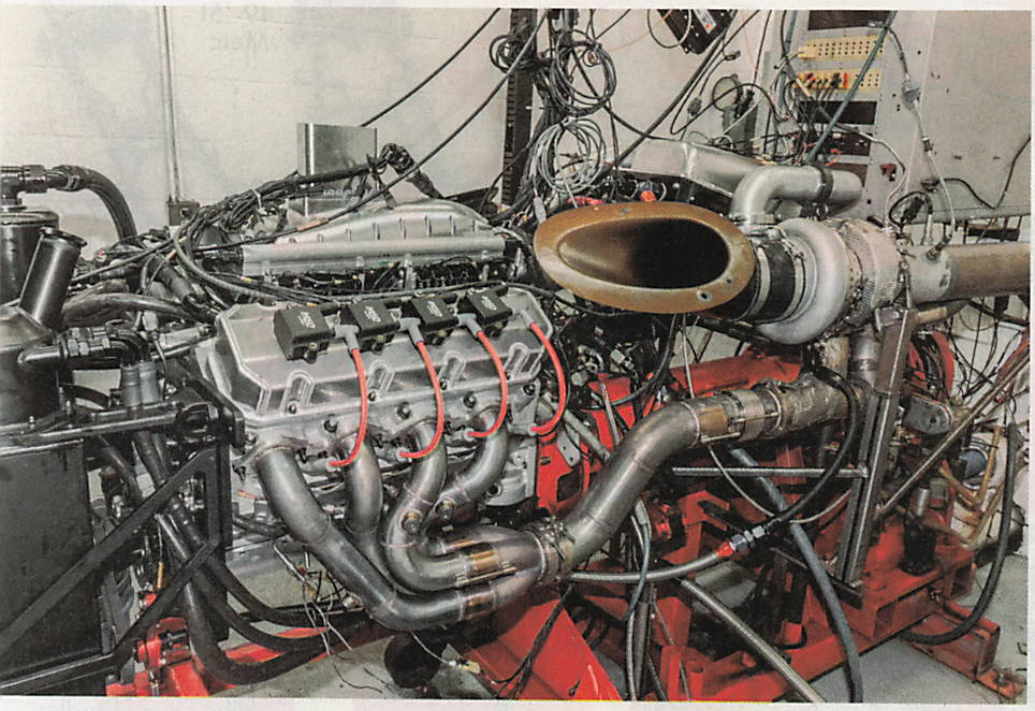


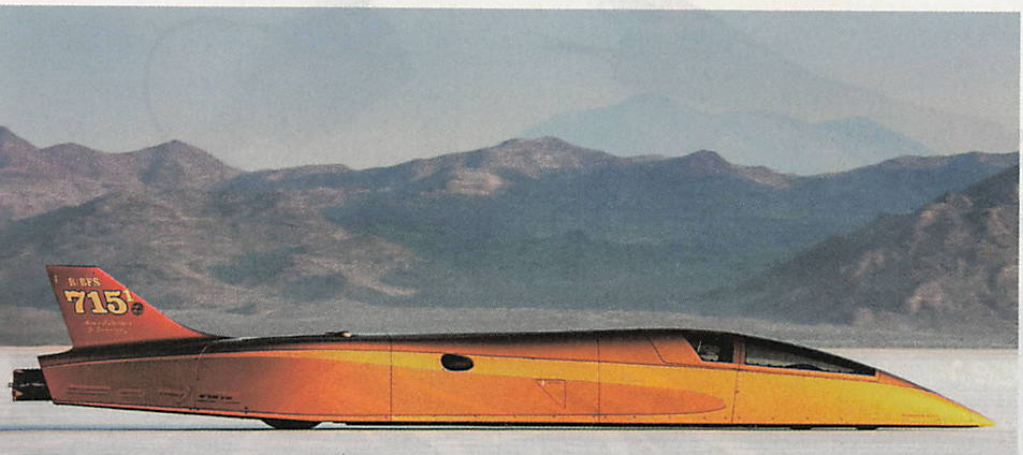
King Rat: Duttweiler Performance's 567ci, 3,155.6hp, methanol-fueled, dual-turbo, land-speed-racing (LSR) engine is based on Dart's Big M iron block and PRO1 20° cast-aluminum heads plus a trick tool-steel Comp Cams solid-roller bumpstick.

The Nuclear Option

Marlan Davis
Marlan Davis, Ken Duttweiler, Steve Watt

Ken Duttweiler and the Speed Demon Streamliner team aim to blow up the world's fastest piston-driven engine record with a 3,000-plus hp, 557ci, twin-turbo big-block Chevy.

In the Southern California Timing Association (SCTA) list of Bonneville LSR (land speed racing) record book, the Speed Demon Blown Fuel Streamliner (BFS) driven by George Poteet holds virtually all the top V8 speed records using Ken Duttweiler-built small-block Chevy or LS V8 engines, as well as a couple of outliers with four-cylinder engines. As of April 2020, the record list includes A/BFS, B/BFS, C/BFS, D/BFS, F/BFS (with a Dodge four-cylinder), and X/BFS (with a Ford flathead). However, AA/BFS—the top, and theoretically fastest "unlimited" wheel-driven, piston-engined class—is one record the team has never held, because it mandates a 501ci or larger engine or engines, which the team has never run. That's big-block territory, and the record has been stuck at 417 mph since 2004 when it was last set by Burkland's AWD (all-wheel-drive) Streamliner running two supercharged Generation II Chrysler Hemis on alcohol. But now there's dust on the distant horizon, the ground vibrating with the pounding of hoofs: On the way are 3,100-plus rampaging horses and the roar of a Duttweiler 557-inch, twin-turbo, electronically managed Bonneville-bound big-block Chevy. The Speed Demon team (sorry, Rambo) says, "We're coming for you!"—coming for that old AA/BFS record; coming for the two-way, top-speed, wheel-driven, internal-combustion engine record of 448.757 mph set in 2018 in AA/FS (unblown fuel streamliner) by Danny Thompson in his refurbished 50-year-old Challenger 2 running two normally aspirated nitro-fueled Chrysler Hemis; coming for 460-plus mph. Duttweiler has finally unleashed the nuclear option. Time to blow up the record for the next 20 years.



George Poteet's Speed Demon holds more Blown Fuel Streamliner records than any streamliner ever built. Now it's gunning for the ultimate Bonneville piston-engine, wheel-driven class record: AA/BFS.

Wes Allison

Sources

ATI Performance Products Inc.; Gwynn Oak, MD; 877.298.5039 (orders) or 410.298.4343 (tech); ATIracing.com

Auto Verdi Racing Pumps & Rods; Sweden; +46.241.10252 (pumps) or +46.240.594301; AutoVerdi.com

Automotive Racing Products (ARP); Ventura, CA; 800.826.3045 or 805.339.2200; ARP-Bolts.com

C&R Racing Inc.; PWR Performance Products Group; Indianapolis, IN; 317.293.4100; CRracing.com

Callies Performance Products; Fostoria, OH; 419.435.2711; Callies.com

Clevite Mahle Aftermarket Inc.; Farmington Hills, MI; 800.248.9606 or 248.347.9700; Mahle-Aftermarket.com

Comp Cams; Memphis, TN; 800.999.0853 or 901.795.2400; CompCams.com

Dailey Engineering; Temecula, CA; 951.296.2110; DaileyEngineering.com

Dart Machinery Ltd.; Troy, MI; 248.362.1188

Diamond Racing Pistons; Clinton Twp., MI; 877.552.2112; DiamondRacing.net

Dura-Bond Bearing Co.; Carson City, NV; 775.883.8998; Dura-BondBearing.com

Duttweiler Performance; Ventura, CA; 805.659.3648; kduttweiler@earthlink.net

Enderle Fuel Injection (Good Vibrations Racing); Whittier, CA; 800.576.7661 (orders) or 562.945.7669 (tech); GoodVibesRacing.com

Ferrea Racing Components; Ft. Lauderdale, FL; 888.733.2505 or 954.733.2505; Ferrea.com

Jesel Inc.; Lakewood, NJ; 732.901.1800; Jesel.com

Lucas Oil Products Inc.; Corona, CA; 800.342.2512 or 951.270.0154; LucasOil.com

M&W Ignitions; Kurnell, NSW, Australia; +61.2.9668.8481; MWignitions.com

Manton Pushrods; Lake Elsinore, CA; 877.626.8667 or 951.245.6565; MantonPushrods.com

Maxwell Industries Inc.; Ventura, CA; 805.798.0953; MaxwellIndustries.com

MoTeC Systems USA; Huntington Beach, CA; 800.845.7580; MotecUSA.com

Nitrous Supply; Huntington Beach, CA; 714.373.1986; NitrousSupply.com

MSD, A Holley Brand; El Paso, TX; 888.258.3835; Holley.com/brands/msd

PAC Racing Springs; Southfield, MI; 866.799.9417; RacingSprings.com

Precision Turbo and Engine; Hebron, IN; 855.996.7832 or 219.996.7832; PrecisionTurbo.net

RCD Engineering Inc.; Nevada City, CA; 530.292.3133; RCDengineering.com

SCE Gaskets LLC; Mount Pleasant, TN; 800.427.5380; SCEgaskets.com

Siemens Deka; Muscle Motors, authorized US distributor; SiemensDeka.com

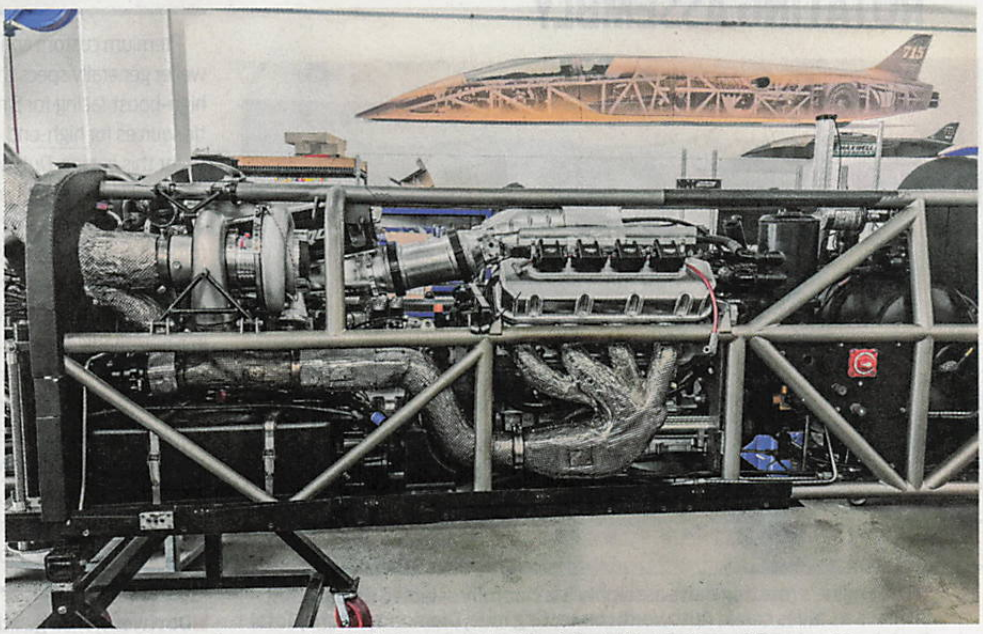
Total Seal Inc.; Phoenix, AZ; 800.874.2753 (orders) or 623.587.7400 (tech); TotalSeal.com

Victory 1 Performance Inc.; Mooresville, NC; 704.799.1955; TitaniumValve.com

Visner Engine Development; Kentwood, MI; 616.726.6600; VisnerEngine.com

"We avoided the Chevy Rat motor in the past," elaborates Duttweiler. "We didn't think a big-block Chevy would fit between the Speed Demon's narrow framerail width." But conventional asymmetrical intake-port Dart big-block heads have evolved to the point they're good enough to support the kind of boosted airflow necessary to do the job, making the extreme tall runner, symmetrical-port Big Chief Pro Stock-level heads no longer a necessity. With lower-profile heads, the overall big-block engine envelope is slightly narrower, able to squeeze between the existing framerails and bolt up to the existing front engine-mounting plate. A big-block is about 1 7/8-inches longer than a traditional small-block, so the crew moved the Liberty seven-speed trans back to make room for it. If the team elects to tune up some of the lower-class small-block records it already owns, the smaller-displacement Mouse and LS engines fit the revised layout by adding a rear spacer plate behind the small-blocks.

With modern tech, the "dinosaur" big-block Chevy has so much power potential, it can get by with just modest boost levels. No need to run the big-block on the ragged edge as was sometimes necessary with the Speed Demon's previous small-displacement engines. Also cool is just how many major parts—including the block, cylinder heads, and turbos—have become off-the-shelf aftermarket components that (at least on a big-block) work right out of the box. The basic geometry of the turbos, plumbing, and chassis interface are a durable and reliable combination with a long track record in Demon's previous incarnations. Not that there haven't been further refinements in rods, pistons, intake manifolds, and intercooler technology. Here's what going on inside a state-of-the-art big-block LSR engine.



With the body panels removed, this is the new big-block installed in Speed Demon. It's so clean, it reminds this writer of classic World War II liquid-cooled, fighter aircraft piston-engine installations. Well, except for the modern electronic controls. Note the rear-facing throttle-body inlet. Not an inch of wasted space here.

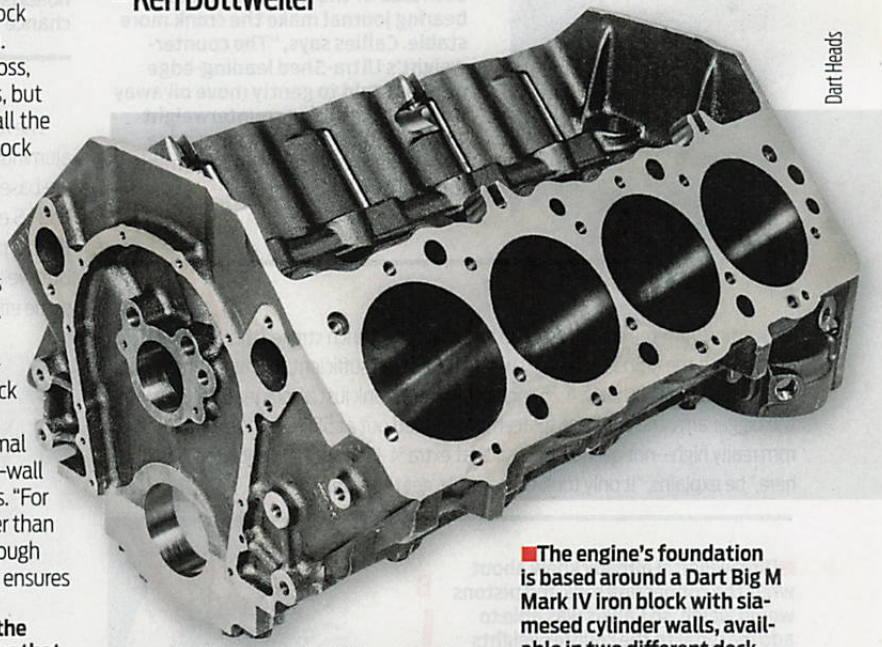
"A big engine may not make the same efficiency as you would with a little one, but you will still make big numbers with a big engine."
—Ken Duttweiler

CYLINDER BLOCK

Dart's Big M iron blocks use billet-steel four-bolt main caps with splayed outer bolts and feature the Gen VI big-block's 0.300-inch taller lifter bores. Duttweiler is using the standard Chevy passenger-car deck-height block delivered with 4.560-inch bores (which Duttweiler finished to 4.565). Production side-engine mount provisions, a mechanical fuel pump boss, and a standard Chevy oil filter mount come standard on these blocks, but Duttweiler specified some additional options: He had Dart machine all the cam journals to 55mm, the same as modern LS engines (stock big-block cam journals range from 53.848mm to 54.356mm). "I like the big LS journals," he says. "They make for a nice cam-journal size. We can have a little larger cam base circle, making for a more rigid billet cam, even with extreme lobe lifts."

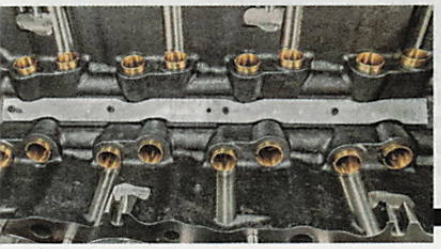
For greater strength, Duttweiler special-ordered the block with Dart's $2,000-extra compacted graphite iron (CGI) alloy block-casting option. Recommended for turbocharged, supercharged, and nitrous-oxide applications, this alloy doubles the casting's strength compared to conventional iron blocks without adding weight. Duttweiler notes a CGI block is harder to machine and shortens boring and honing tooling life. On his Sunnen CD16 hone, he generally ups the load-meter setting from a normal 20-percent value to as high as 40 percent to break through the cylinder-wall surface. "The harder you load the surface, the harder it cuts," he explains. "For greater consistency, I use Sunnen Industrial stones that are a little longer than their regular automotive stone. We keep the final surface finish on the rough side. With alcohol [as a fuel], it's always trying to dilute the oil. Rougher ensures more oil in the crosshatch." When hardcore engine builders talk surface finish, they refer to RVK and RPK values as measured by a profilometer. "RVK is the valley of the crosshatch cut, RPK is the height. For a CGI block we run an RVK of 45 to 47, with an RPK of 14 to 17."

"CGI blocks are what they use today in NASCAR, Pro Stock, and big diesel over-the-road trucks. If you're gonna do it, may as well do it right."
—Ken Duttweiler



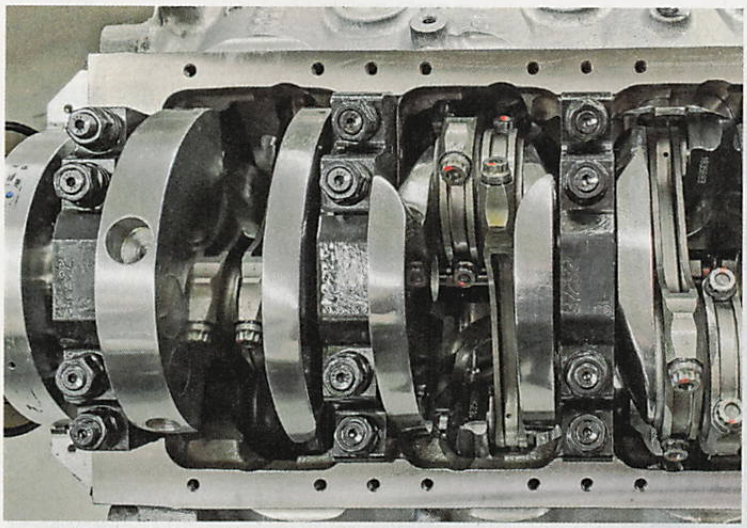
Dart Heads

The engine's foundation is based around a Dart Big M Mark IV iron block with siamesed cylinder walls, available in two different deck heights (passenger car with 9.800 inches, or the raised "truck-style" 10.200 inches). As-delivered bore sizes range from 4.25 inches all the way up to 4.600 inches.



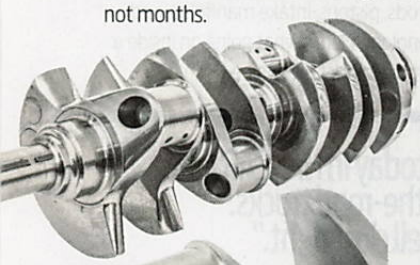
Visible in the valley are the oversize bushed lifter bores that accept Jesel keyed lifters and an antidebris plate installed by Duttweiler over the oil drain-back slots that prevent any upper-end parts failures from falling into the rotating assembly.

ROTATING ASSEMBLY

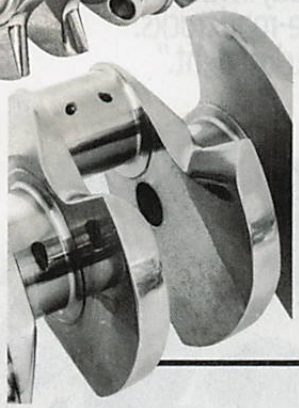


The engine's rotating parts assembly is a carefully selected medley that includes a Callies crank, Auto Verdi connecting rods, Diamond pistons, Total Seal rings, and ARP Custom Age 625+ fasteners to hold it all together. Note the Dart block's billet four-bolt main caps with splayed outer bolts and multipattern oil pan mounting holes.

Rigidity and dependability are the mandate for triumphing at Bonneville. Rotating weight is not as critical as structural integrity when an engine needs to make thousands of horsepower but has 5 miles to get there. Then, too, part of the selection criteria was availability in a reasonable time period of weeks, not months.

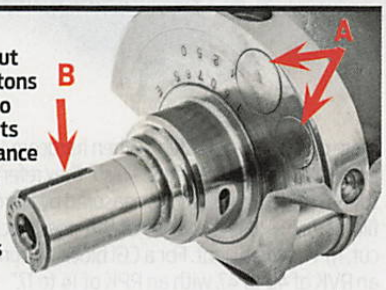


Callies makes its Ultra Billet Crankshafts from low carbon, high nickel steel. They're then subjected to multiple heat treatments resulting in a crank with fracture-resisting ductility, stiffness, and a wear-resistant outer case.



An extra center counterweight on each side of the No. 3 center main-bearing journal make the crank more stable. Callies says, "The counterweight's Ultra-Shed leading-edge profile is said to gently move oil away from the oncoming counterweight while the directional trailing edge directs oil away from the oncoming rod journal."

Starting with the crankshaft, Duttweiler says a 4-inch stroke (that yields a 524ci engine with the 4.565-inch bore) would have been sufficient, but as it turned out, crank-maker Callies had a 4.25-inch billet-steel crank just about ready to go. With the bigger arm, the engine displacement topped out at 556.5 ci. "We don't have to rpm really high—not over 9,000—so that extra ¼-inch stroke is not a real liability here," he explains. "It only took 1½ weeks to get the crank."



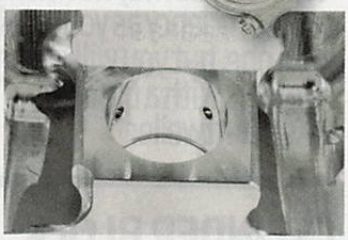
Duttweiler: "I already knew about what the connecting rods and pistons would weigh, so Callies was able to add material to the counterweights that enabled me to internally balance the crank with a minimal amount of extra Mallory metal slugs." (*A*) There's an extra single ¼-inch keyway (*B*) on the crank for Roots supercharger pulley drives.

"On a boosted engine, R/S ratio isn't as important. Pressure fills the cylinder, not compression."—Ken Duttweiler

Premium custom connecting rods are usually another long-lead item. Duttweiler generally specs thicker, heavier rods to withstand the prolonged stress of high-boost racing for 5 miles at a clip. According to Duttweiler, the usual domestic sources for high-end, "heavy" special rods often have lead times of months, so for this engine, Duttweiler went offshore to a new vender: Sweden's Auto Verdi Racing. Verdi may not be a big name stateside, but is well known in Europe and has recently been making a name for itself in NHRA Pro Stock. Auto Verdi forges its rods in-house out of Swedish chrome-nickel molybdenum steel, and machining is via the latest CNC tech. Because it's all handled in-house, Verdi's H-profile con-rods are available in virtually any length, bearing size, and pin size in a reasonable time period. The rods are custom-made for each customer, and the customer receives an engineering blueprint to verify the design's characteristics before production proceeds.

"Verdi offered to make any rod we wanted," relates Duttweiler. "I knew 930 grams is about the right weight for reliability, and 6.400 inches center-to-center was the length needed with the piston and ring pack I wanted to use in a 9.8-inch deck-height block. No problem for them—30 days later, we had 10 rods (including two spares) for $3,800."

Duttweiler: "To get the weight we wanted and add strength, Auto Verdi thickened the rod. With ARP Custom Age 625+ capscrews—290,000-psi tensile strength—we could get the clamp load we needed with 7/16-inch rod bolts instead of going with larger, heavier ½-inch bolts."

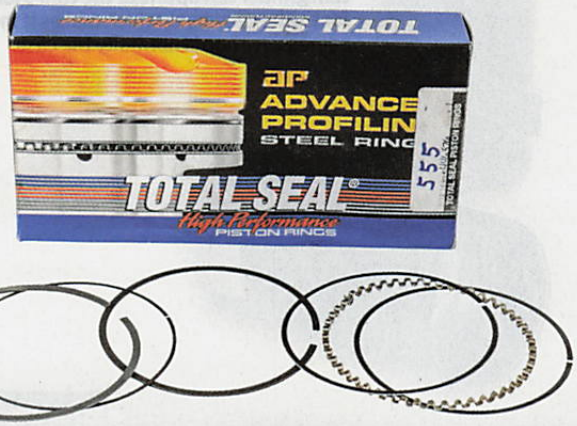


Today, nearly all H-beam rods have the pin-oiler holes in the beam slots on each side of the rod. Diamond also uses dual piston pin-oilers in the piston pinholes. Whether this is superior to conventional single rod-end holes is hard to quantify, but logically two holes seemingly provide more chance for the parts to get oiled.

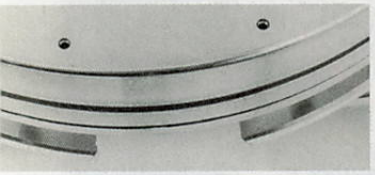
The rods swing Diamond deep-dish pistons forged from boost-friendly 2618 aluminum alloy. Diamond's pistons and unbendable, thickwall H-13 tool-steel pins are based on a turbo-friendly configuration Duttweiler has used in his small-blocks and LS engines. Wire-Locks retain the chamfered pins in the rods. "The harder the pin pushes against the Wire-Lock, the more the lock embeds into the piston," Duttweiler says. "I've never had a failure with a Wire-Lock—but they really take some effort to install."

The Diamond pistons spec'd by Duttweiler are strong and thick enough to handle prolonged boost, with a deep dish that develops around 9.3:1 compression on the boosted, methanol-fueled engine. The H-13 tool-steel 0.990-inch-od big-block Chevy pins have extra-thick 0.250-inch walls and a DLC (diamond-like carbon) antifriction/antiwear coating.

Total Seal supplied the piston rings. Several factors dictate the ring-pack configuration and its location on the piston. Duttweiler explains, "The deep dish effectively lowers the top of the piston, and on a big-block we also must clear the valve relief, so I needed to put the first ring about 0.350 inch down from the deck. With the first ring that far down and the 1.260-inch piston compression distance (C/D) dictated by the stroke and rod length, the oil ring gets into the top of the pinhole, requiring oil rail supports. I wanted a 3/16-inch heavy-tension oil ring for better sealing and oil control; we don't need to free up any horsepower. We use a 0.043-inch cast ductile-iron 'Napier' hooked second compression ring that acts like a squeegee, again for better oil control. In the top groove is a 1/16-inch-thick, fusion-coated, C-33 tool-steel ring, which is undercut to accept a 0.020-inch gapless spacer ring. This permits a rather large 0.031-inch gap on the main top ring component to better resist butting under extreme heat buildup."



Duttweiler uses Total Seal oil rings. "Oil control in the cylinders is critical for suppressing detonation, so we used a heavy-tension oil ring, a Napier second compression ring, and a gapless top compression ring."



Piston gas-porting helps better load the top ring against the cylinder wall.

One theoretical issue is the rotating assembly's relatively low 1.51:1 rod/stroke (R/S) ratio. "Boosted engines in particular like long rods," allows Duttweiler. "But it's not because the rod ratio versus piston dwell time factor near TDC is that big a deal. On a boosted engine, pressure fills the cylinder, not compression. It's just that a longer rod reduces cylinder wall side-loading; there's less thrust, less angularity—it kind of smooths everything out. We don't need to turn much over 8,000 [rpm] to get the job done—though it will go beyond that if necessary—so I don't think there's any real liability in this case. We had to get the engine to fit in the existing chassis. The packaging is what it is. In the final analysis, you have to look at the 'box' you need to put everything in and go accordingly."

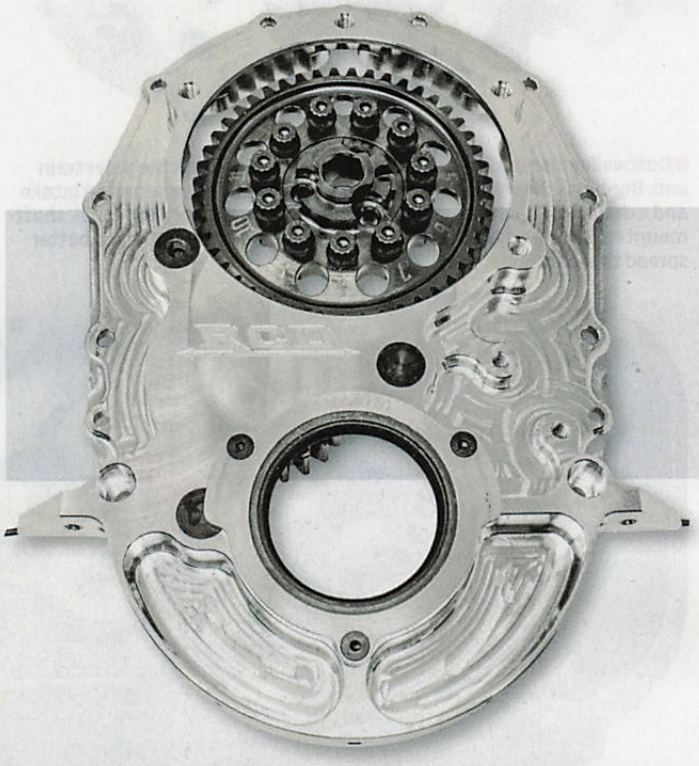
ATI

Duttweiler: "There's nothing special about the 7-inch ATI SFI-certified steel harmonic damper—except it plain works. I use ATI dampers on all my motors."

Both crank and rods ride on coated and chamfered Clevite racing bearings. "I believe in coated bearings. They look really good, in appearance, when you tear the engine apart. Coating eliminates roughness, and we see better wear characteristics." Duttweiler specs 0.001-inch thinner Clevite 829HXK TriArmor main bearings to compensate for the coating thickness as well as the rather high 0.003 to 0.0035-inch main bearing clearance Duttweiler likes to run. He gaps the rod bearings tighter, at 0.0023 inch. Crank endplay is a rather high 0.008 inch. "I'm happy with that. This pushes the crank forward, which minimizes the oil escape path. But you must chamfer the main bearings! I don't worry about rod side clearance. If they rattle and don't rub, that's good enough. I guess that comes out to around 0.020 inch. It's better to have cooling oil flow, rather than to heat the metal up—if you have enough oil pump."

CAM AND VALVETRAIN

Comp Cams ground Duttweiler's custom mechanical roller cam from a tool-steel billet. "Tool steel is better material," Duttweiler says. "It's more wear resistant, thanks to one-pass machining that results in the same hardness all the way through. With normal alloys, you often will see a lifter-roller mark on a used lobe. Not with these billets!"



RCD Engineering

A three-piece RCD geardrive spins a custom Comp Cams mechanical roller cam ground on a tool-steel billet.

Spinning in Dura-Bond cam bearings, the custom Comp Cams mechanical roller cam in the 557 has 280/296-degrees intake/exhaust duration at 0.050-inch tappet lift, with a total lift of 0.850-inch at the valves. It's ground on a wide 115-degree lobe separation angle (LSA) and installed straight up. "The wide LSA shortens up the combustion time in degrees by closing the intake valve a little later. This helps prevent detonation. On a turbo engine, we keep the overlap down yet still make good power, because it keeps exhaust from blowing up the intake runner." The other benefit from a wide LSA and reduced overlap is scads of piston-to-valve clearance. "We easily have 0.200-inch-plus clearance on both intake and exhaust."

Uniquely, the exhaust lobe profile is one of Comp's new Top Fuel cam designs. "There's more cylinder pressure on the opening side of the exhaust valve than normal," explains Duttweiler. "It wants to pull the exhaust rocker stand mounting studs out of the head. So we figured, why don't we slightly decrease cylinder pressure by slowing the exhaust valve opening point a few crank degrees?"

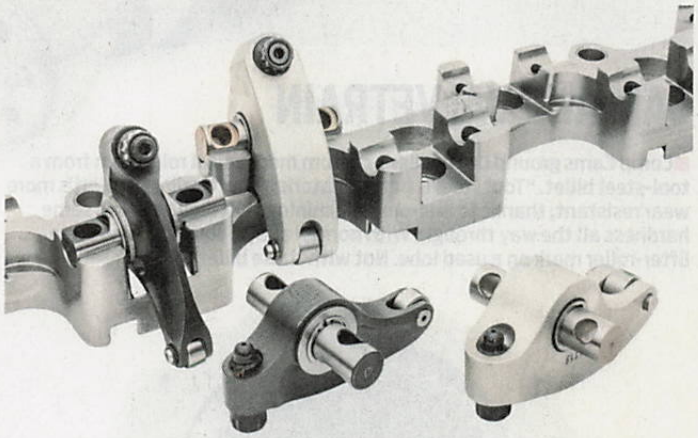
"We run wide lobe separation, not huge overlap."
–Ken Duttweiler

COMP CAMS CUSTOM MECHANICAL ROLLER CAM SPECS

This cam features 55mm stepped cam journals and a 4/7 cylinder firing-order swap. All values in crankshaft degrees, except as indicated.

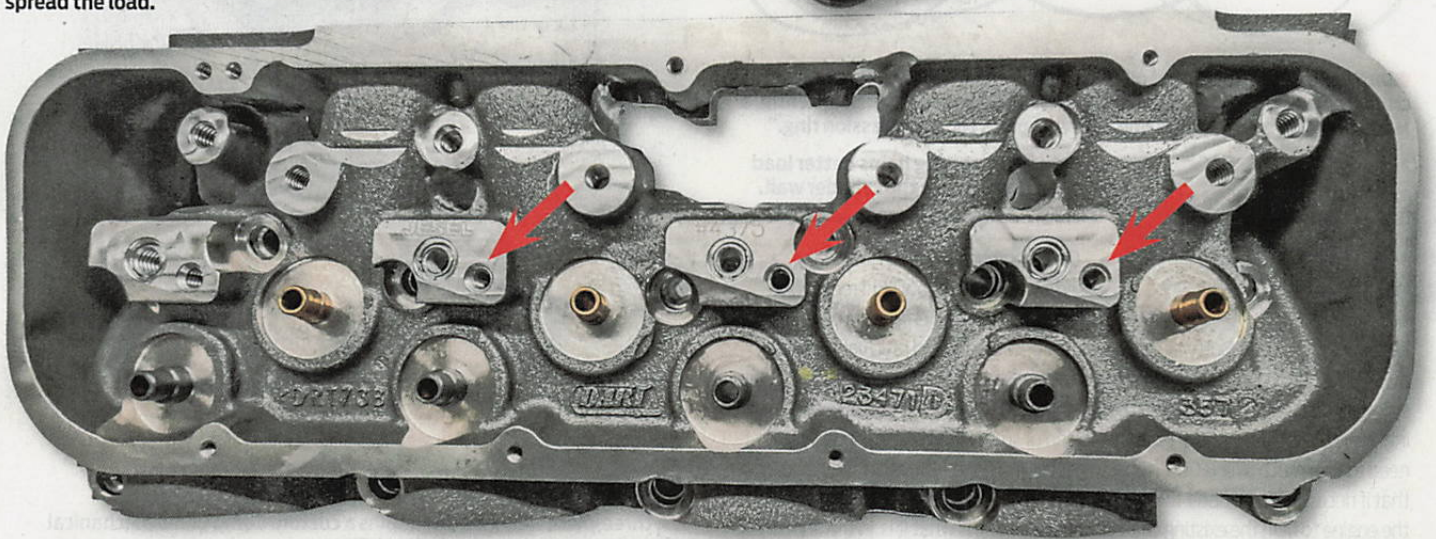
GRIND	PART NO.	VALVE LASH		LIFT (INCHES)				DURATION AT TAPPET				TIMING, 0.050-INCH TAPPET LIFT				LOBE CENTERLINE		
				LOBE		VALVE (1.7:1 RATIO)		0.020-INCH LIFT		0.050-INCH LIFT		INTAKE		EXHAUST				
		INTAKE	EXHAUST	INTAKE	EXHAUST	INTAKE	EXHAUST	INTAKE	EXHAUST	INTAKE	EXHAUST	OPENS	CLOSES	OPENS	CLOSES	INTAKE	EXHAUST	LSA
24750RG/24763RG	11-000-13*	0.016	0.018	0.500	0.500	0.850	0.850	314	331	280	296	25 BTDC	75 ABDC	83 BBDC	33 ATDC	115	115	115

*Generic number assigned to a special-order big-block Chevy custom mechanical roller cam.



Keyed Jesel lifters better resist rotation compared to link-bar type lifters. The bodies on this engine have a larger 0.937-inch lifter body (stock GM is 0.842). A larger lifter allows using a bigger roller wheel, which spreads the load better, reducing wear by rotating slower. The cam grinder can optimize the cam's lobe profile for the larger wheel, which makes it more aggressive than is normally the case.

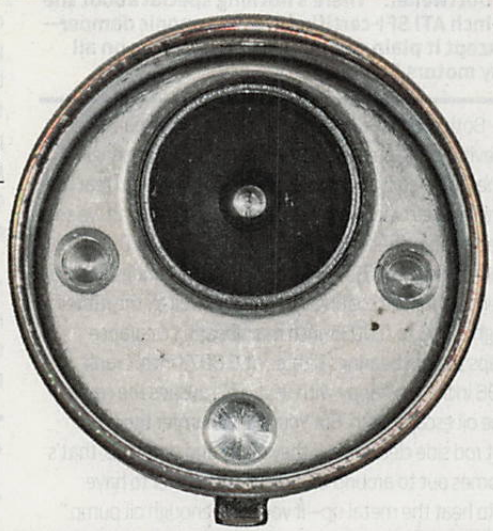
Duttweiler also addressed the stud-pulling issue from the valvetrain end. Big-block Chevy shaft-mount systems usually have separate intake and exhaust rocker stands, but Jesel made this one-piece big-block shaft-mount rocker stand that ties the intake and exhaust together to better spread the load.



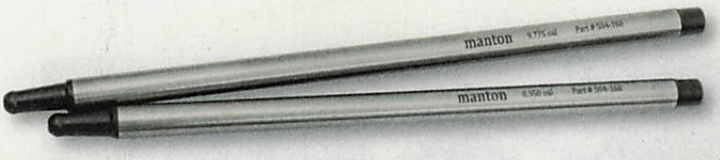
Two mounting bolts per pad are better than one! Jesel's custom shop machined the Dart heads for a second set of rocker-stand retention holes (*arrows*) to mate up with its more rigid one-piece rocker stand.

The cam lobe order is for a 4/7 firing-order swap. Traditional Chevy V8s use a 1-8-4-3-6-5-7-2 firing order; with a 4/7 swap the order becomes 1-8-7-3-6-5-4-2. Adherents of a 4/7 swap claim it decreases crankshaft deflection, delivers a smoother torque curve, aids acceleration, and may even deliver a few more horsepower. (HOT ROD once tested a normally aspirated big-block Chevy where a 4/7 swap did show some midrange and top-end gains, see: "Testing Lunati Cams—Swap Cam Test" on hotrod.com.)

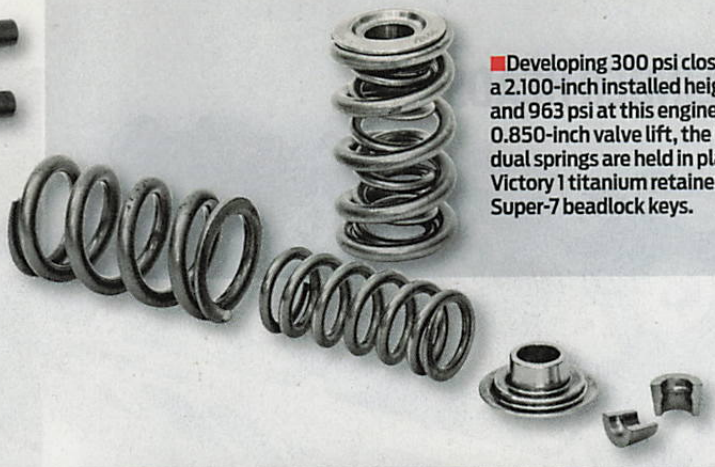
But Duttweiler isn't so sure. "Whether we actually make more power, it's hard to say." For him, it's primarily for convenience. His use of a 4/7 swap dates back years to when he built the first small-blocks for Speed Demon. Back then, billets capable of supporting his preferred lobe profiles were more widely available for a 4/7 swap. The computer and wiring harness were in turn set up to support the 4/7 swap. Today, standard firing-order cam billet availability isn't an issue, but to aid speedy engine changes for different classes, Duttweiler still uses the 4/7 swap configuration on all Speed Demon engines—conventional small-blocks, LS-based engines, and now the big-block. That way, "everything from computer to ignition box stays wired the same."



A larger-diameter lifter body also provides room to offset the pushrod seat, improving the pushrod angle on canted-valve big-block Chevy heads. Getting the angles right on this build requires four offset intake-side lifters: two with a 0.180-inch offset and two with a 0.080-offset; the exhaust-side lifters are all on-center.

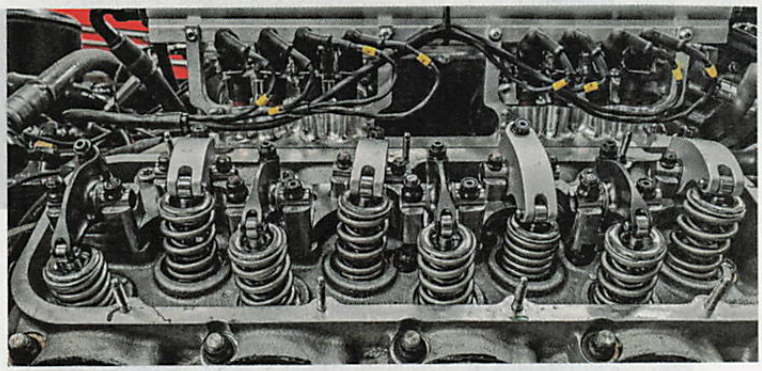


Manton 7/16-inch-od, 8.9500-inch-long intake/9.775-inch-long exhaust chrome-moly pushrods actuate the valves.



Developing 300 psi closed at a 2.100-inch installed height and 963 psi at this engine's max 0.850-inch valve lift, the PAC-1356 dual springs are held in place by Victory 1 titanium retainers and Super-7 beadlock keys.

Duttweiler spec'd 11/32-inch-stem Ferrea valves: a lightweight, 6.030-inch-long, 2.40-inch-od, titanium intake, and a high-temp-resistant, 5.930-inch-long, 1.800-inch-od Inconel exhaust.



Here's the completely assembled Jesel single-shaft valvetrain along with PAC springs and Victory 1 retainers. The 1.7:1 Jesel Pro Series shaft-mount rockers use weight-saving aluminum intake rockers on the intake side, but Duttweiler went with knife-edged steel Jesel exhaust rockers that better withstand the exhaust valve's turbo-induced high opening pressures.

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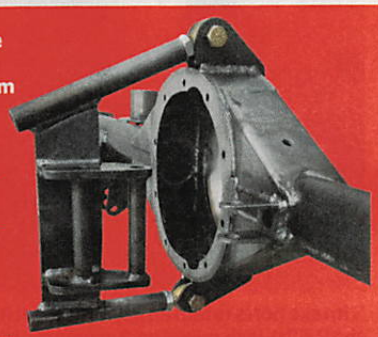

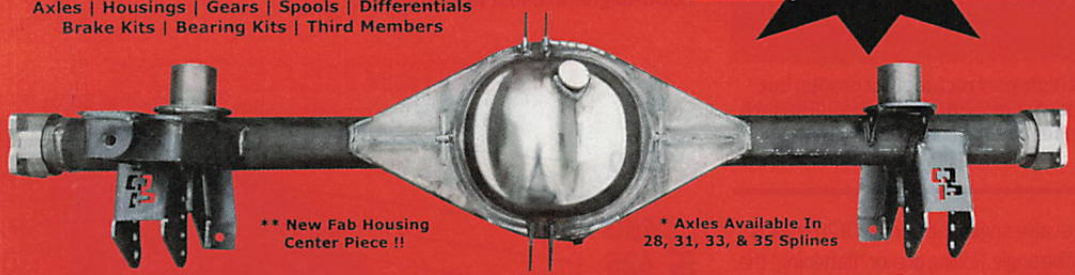

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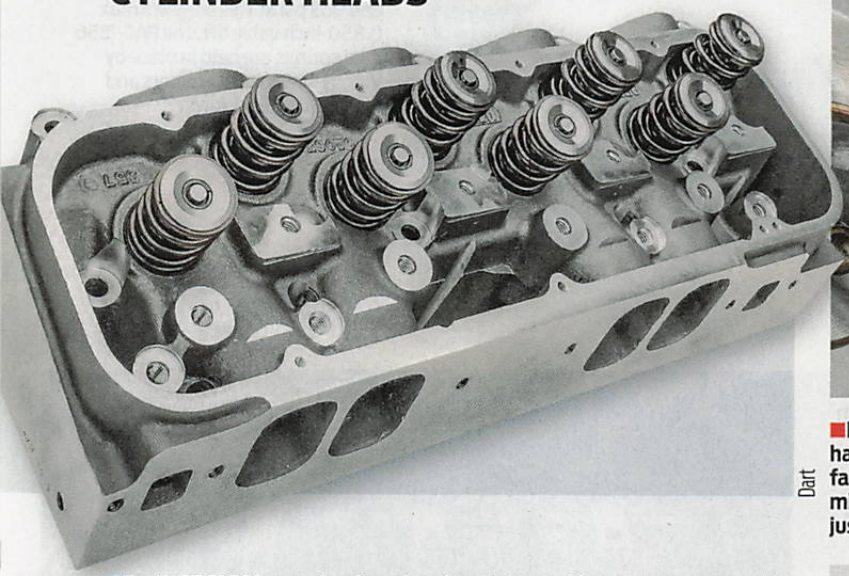
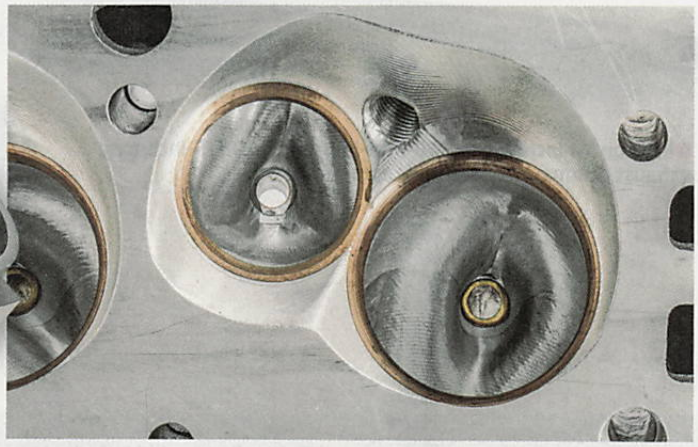
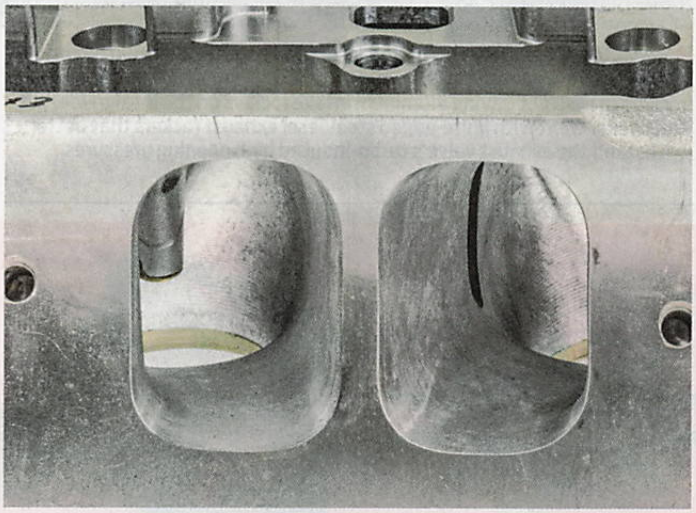
CYLINDER HEADS



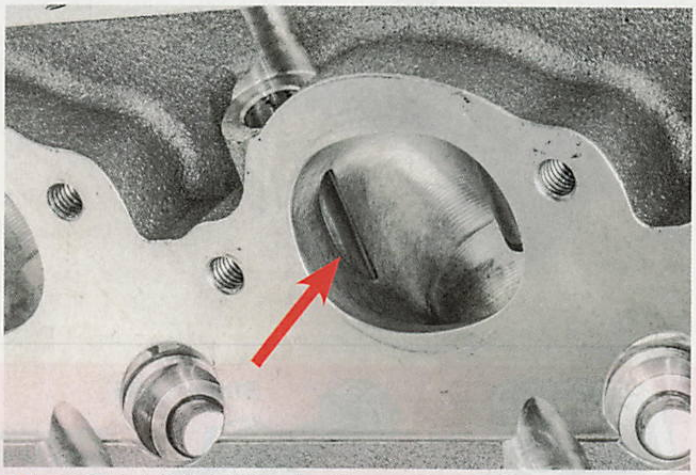
Dart's PRO1 20° cast-aluminum heads are intended for maximum competition, large-displacement, Rat motors running 8,000 rpm or higher in normally aspirated (NA), nitrous or big-boost applications. They're available in many configurations and special-order options, bare or fully assembled.



Most aftermarket big-block Chevy conventional open chamber heads have 115-121cc combustion chambers, but the redesigned heart-shaped fast-burn chambers in Dart's 20° heads displace just 97 cc. (Duttweiler milled the deck surfaces 0.040 inch, further reducing volume down to just 86 cc.)



Intake ports retain an asymmetrical high-perf rectangular profile, but the 0.500-inch raised port entrances measure 2.600 inch tall x 1.850 inch wide. The 451cc CNC-ported intake runner volume is the largest in the PRO1 series.



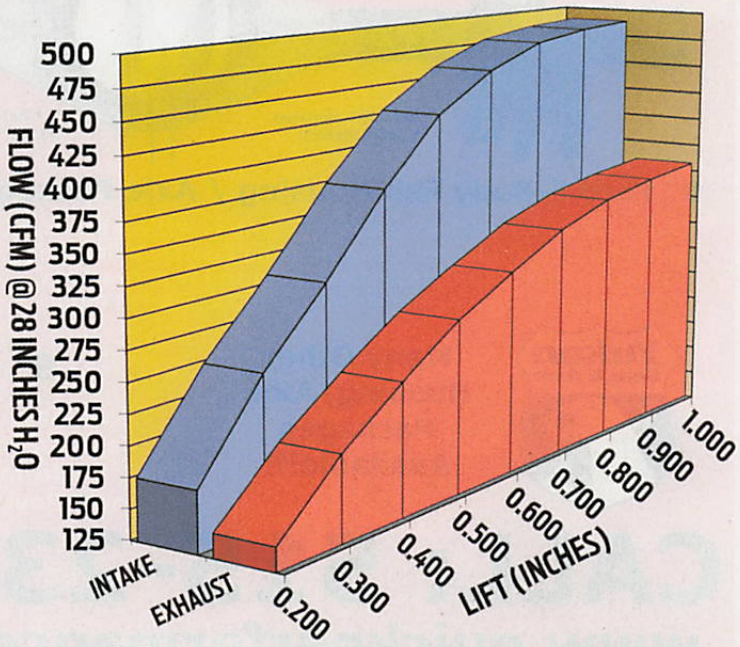
The 1.825-inch-tall x 2.125-inch-wide oval-shaped exhaust ports are raised 0.600 inch over stock. This view shows how the head stud breaks through the exhaust port wall (*arrow*). Later, Duttweiler pressed in stainless steel sleeves that protect the head stud from the turbo engine's 1,600-degree exhaust temperatures.

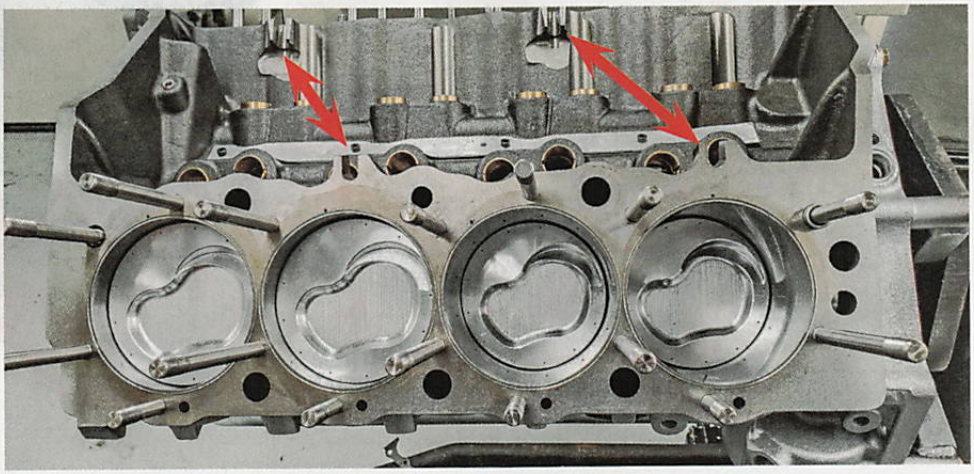
Stock big-block Chevys have a 23-degree valve angle. The Dart PRO1 20° heads installed on this motor have a 20-degree valve angle. Rolling over or "flattening" the valve angle to 20 degrees allows a shallower piston valve relief, smaller combustion chambers that develop high compression with minimal piston domes in NA usage, and an improved short-turn radius to the valve bowl. There are symmetrical raised port heads as well as heads with even shallower valve angles out there, but their much taller profile creates an interference problem in the Demon's tight chassis.

Right: At 0.850-inch valve lift, Dart's intake ports flow over 480 cfm on the intake and just under 720 cfm on the exhaust side—way more than enough to get the job done under boost. At 1.00-inch valve lift they flow 489 cfm, with 0.730 inch on the exhaust side.

Duttweiler says the Dart heads are ready to go out of the box. Even the valve job comes finished on the 55-degree seats, a seat angle specified for their reputedly superior high-lift flow. Duttweiler's set uses beryllium seats on both intake and exhaust; bronze wall guides are used with the titanium intake valves, but due to extreme heat the exhaust seats are steel with a bronze insert.

CYLINDER HEAD FLOW





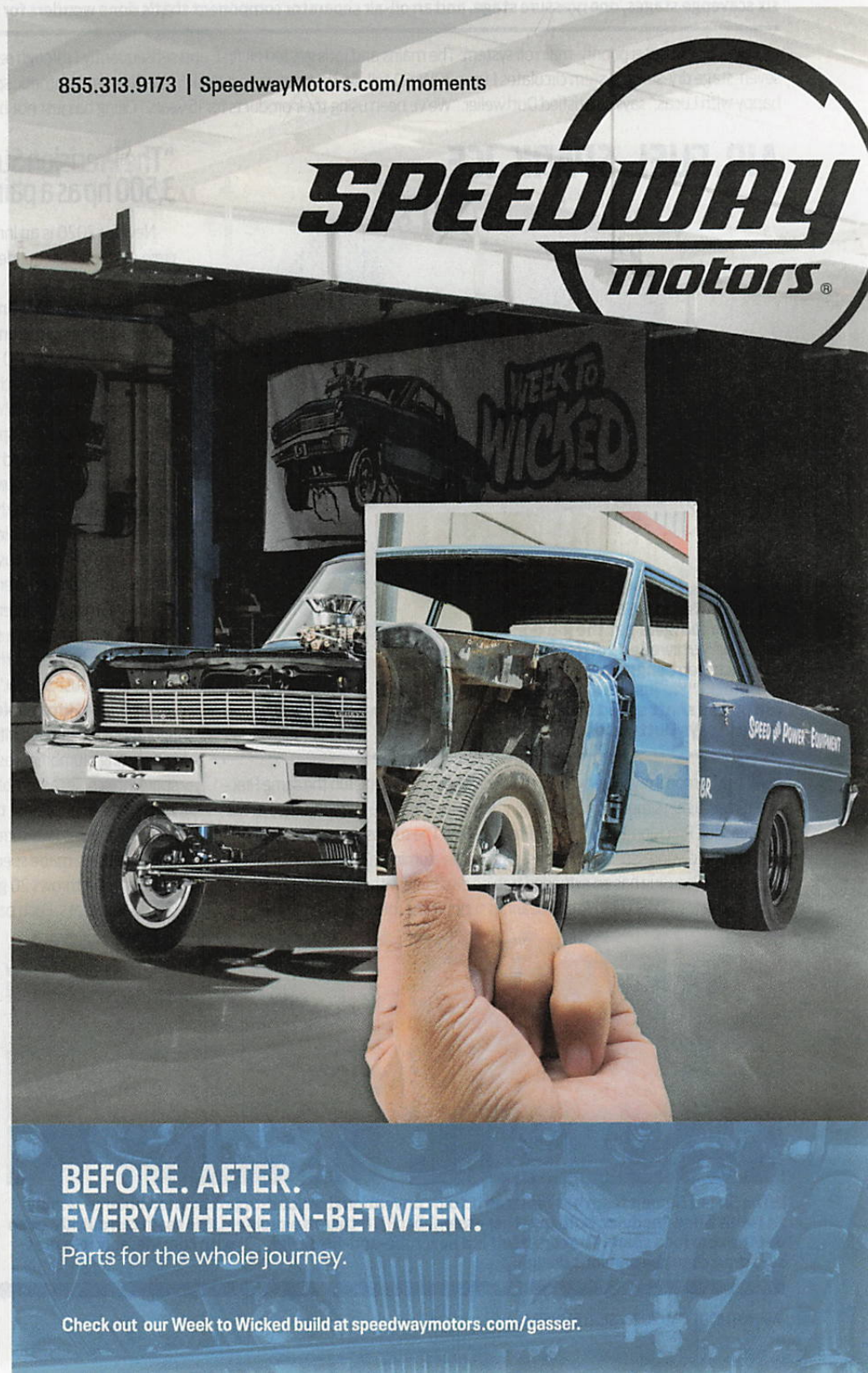
Right: Dart's Big M blocks come with extra lifter valley head-stud bosses (*arrows*) which help head gasket retention, but Duttweiler ups the ante, machining the block and heads with receiver grooves around each cylinder for Visner Engine Flame Hoops, then installing the heads using ARP Custom Age 625+ head studs that take higher torque for greater clamping force.

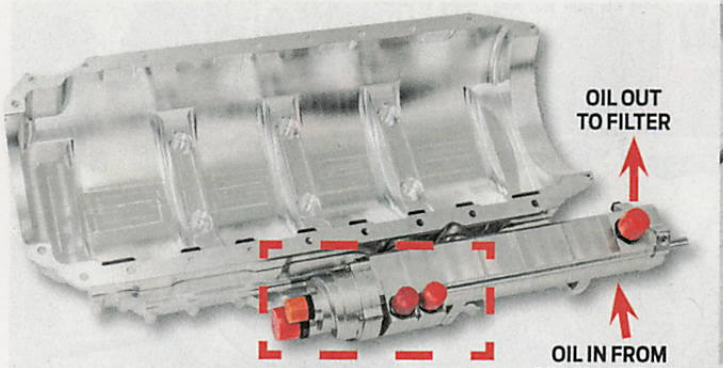
Head gasket sealing has not been a problem. Duttweiler has perfected sealing with SCE copper head gaskets and unique Visner Flame Hoops. The finishing touch is high-alloy ARP Custom Age 625+ 7/16-inch head studs. Custom Age 625+ is an extremely high-tensile alloy (for head studs, 235,000- to 255,000-psi yield, 260,000- to 280,000-psi tensile), way beyond even ARP 2000. ARP supplied all critical fasteners on this engine.

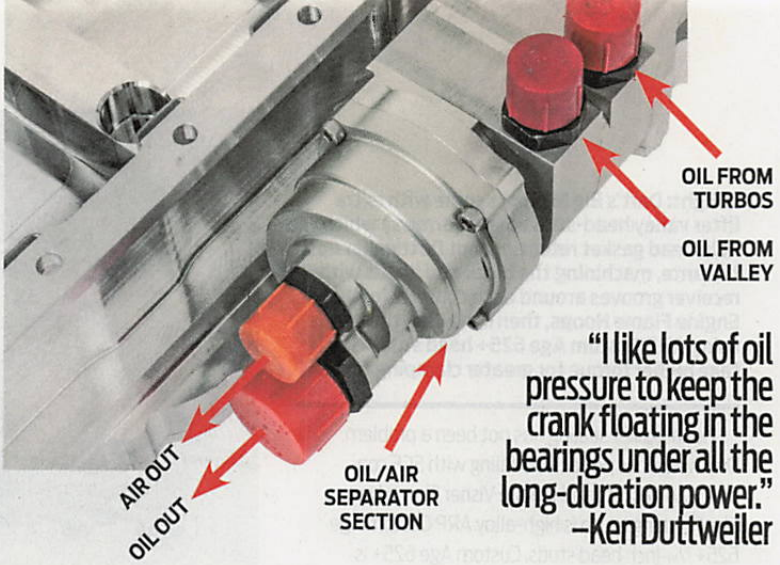
Instead of traditional round O-rings that accept 0.040 to 0.050-inch-thick stainless steel round wire, a Visner Flame Hoop stainless ring is round on the bottom, tapering to a square cross-section on top. The receiver groove machining needs to be more precise, but the result is a very tight fitting, superior seal.

"I don't do anything to the Dart heads, just match my Ferrea valves to Dart's 55-degree valve seat angle. A lot of this stuff is getting so good, we can now use off-the-shelf items in many cases."—Ken Duttweiler

The Visner Flame Hoops are taller than conventional O-ring wire for better bite, which puts a better dimple into SCE's copper head gaskets.







OILING

"I like lots of oil pressure to keep the crank floating in the bearings under all the long-duration power." –Ken Duttweiler

Getting 14 quarts of oil into and out of the engine at over 90 psi is the responsibility of a Dailey Engineering dry-sump oil pan and attached pump with six scavenge stages, one pressure stage, and an oil-air separator component that's done wonders for suppressing any oil-foaming tendencies.

Dart's block uses a priority-main oil system: The mains and rods get fed oil first, and subsequently (through restrictors), the cam, upper end, and valvetrain. A Dailey seven-stage dry-sump system circulates Lucas 20W-50 full-synthetic or special thick 50W-Plus semisynthetic specifically blended for alcohol-burning engines. "I'm very happy with Lucas," says a satisfied Duttweiler. "We've been using their products for 15 years." Oiling has just not been a problem on the big Rat motor.

AIR, FUEL, SPARK, ICE

Widely used in NHRA drag racing, Precision Turbo's GEN2.2 Pro Mod 88 turbochargers get the job done on all of Duttweiler's different displacement engines, even on the big-block. "We just don't have to run up the shaft speed on the big motor," says Duttweiler.

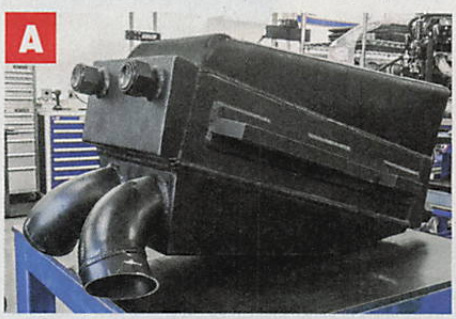
All the Demon's myriad engines, regardless of displacement, run the same Precision turbos, again simplifying quick engine swaps and tuning. Currently, they're twin off-the-shelf Precision Turbo GEN2.2 Pro Mod 88s. The turbos' one-piece center housing and compressor backplate assembly is an aluminum forging; the stainless steel turbine housing has an extended turbine discharge with cross-bolt provisions for added safety. Dual ceramic ball bearings support the rotating assembly.

"The Precision Super 88 turbos are good for 3,400 to 3,500 hp as a pair." –Ken Duttweiler

New for 2020 is an innovative modular, bolt-together intercooler. Demon crew chief and car builder Steve Watt says the new design overcomes several past problems.

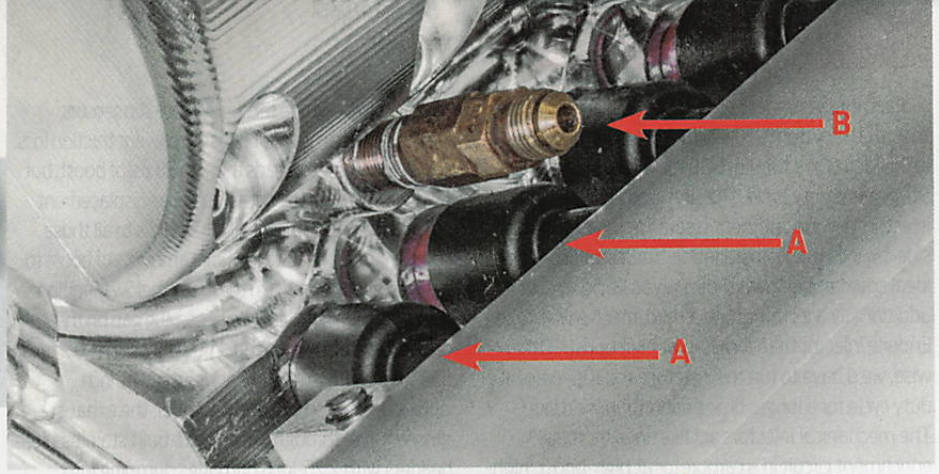
- **A new tube-and-fin intercooler core significantly reduces pressure drop over the traditional block-and-plate-type cores used previously.** "The pressure drop at 40 psi through the new core is now less than 1 psi compared to as much as 2 to 4 psi through the traditional core," Watt explains. "We learned from Magnuson about this, which is what they supply with their superchargers. Capable of supporting up to 4,000 hp, our tube-and-fin cores are currently made by PWR (who purchased C&R, the original manufacturer)."
- **The core, intercooler tanks, and inlets and outlets now bolt together, sealed by O-rings.** "In the past, like everyone, we used an integrated intercooler, where the core, tanks, inlets, and outlets are permanently welded together into a one-piece unit; they cost $7,000 to $8,000 each! If there was a failure or leak, we'd have to throw the entire custom assembly away and build a new one. We decided to make the intercooler modular, with bolt-together tanks. The core just slips inside like meat in a sandwich. Now if we have a leak or failure, we can unbolt the parts and swap out the core without replacing the entire assembly. A new core is just $1,800."
- **Universal intercooler core spares simplify inventory.** "For some configurations we needed different integrated intercooler assemblies because the connecting plumbing was different. If the core failed, we might not always have a spare intercooler assembly for that configuration. The modular principle means all we must change are the tanks, inlets, and outlets. The only spares needed are the intercooler cores (we currently have three extras). The different tank configurations are billet, made special for the team by Visner Engine."

Duttweiler throws 20 gallons of water and ice into the intercooler feed-tank per 5-mile-long pass. Each pass melts about 80 pounds of ice.

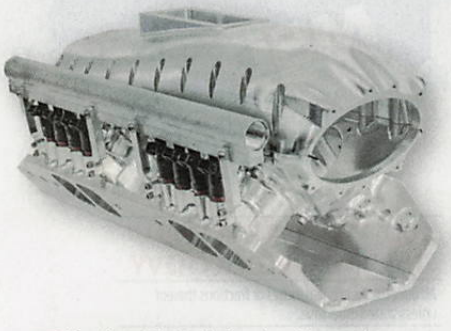


The Speed Demon team has replaced its old conventional welded-together intercooler assembly (A) with a new modular, bolt-together assembly (B). If there's a problem, the team can quickly swap out the core for a spare. The core itself is a new tube-and-fin design (C) with considerably less pressure drop than the previous design.

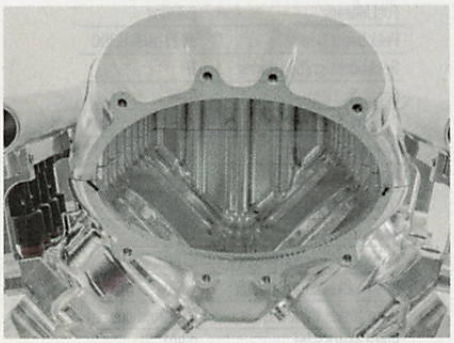
Exiting the intercooler, the air flows through a huge, round tube, then an adapter transitions from the tube to match the 2,300 cfm Visner oval-shape throttle body.



There are three injectors per cylinder: two Siemens EV1 mini EFI units (*A*) plus one Enderle mechanical injector (*B*). "When we get to 2,300 to 2,500 hp, we turn on the mechanical nozzle," Duttweiler explains. "The ECU actuates the Enderles through a large Nitrous Supply high-flow fuel solenoid."



The throttle body feeds a three-piece Visner billet (not sheetmetal!) CNC-machined humpback intake manifold. The oval-shaped throttle body and humpback roof configuration equalizes air distribution and pressure within the plenum chamber.



Another innovation is the custom-made Visner billet oval-shaped throttle body and hump-roof billet intake manifold. The shape and airflow characteristics are similar to the highly effective airscoops used on Pro Mod cars. Dave Visner explains, "A normal round throttle-body opening directs more air to the bottom of the plenum, leading to unequal pressure in the plenum. By going to an oval-shaped throttle body and 20-degree down-angle in the plenum entry, air pressure and distribution in the plenum are equalized. The plenum configuration acts like a shock absorber to more evenly pressurize the overall volume of air in the plenum, which means more even distribution into all the cylinders, front to rear. Behavior in a plenum is chaotic. There's no perfect way to make an inlet manifold, but this design principle also helps prevent reversion out of the runners." In a "wet" application, this principle also helps keep the fuel droplets from falling out of suspension. The inlet's plenum volume is deliberately oversized for the engine size and operating range—otherwise there'd be too much low-end torque and the Demon just wouldn't hook up on the salt.

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Each intake runner has two Siemens fuel injectors that, at the system's 70-psi fuel pressure, flow 250 lb/hr each (for a total of 500 lb/hr) at an 85- to 90-percent duty cycle. The slim-bodied, EV1-type injectors provide sufficient clearance for a canted, side-by-side runner installation that establishes the ideal squirt angle toward the valve's backside, yet additionally accommodate a third, mechanical-type Enderle injector that comes in at high boost. "Otherwise, we'd have to run the injectors at a 100-percent duty cycle for a longer time period than we'd like." The mechanical injectors act like an extra fuel-enrichment circuit in a carburetor at high-boost/high-power levels. "Recently bigger electronic injectors have become available, but we've used this hybrid system for years. It's perfected and it works!"

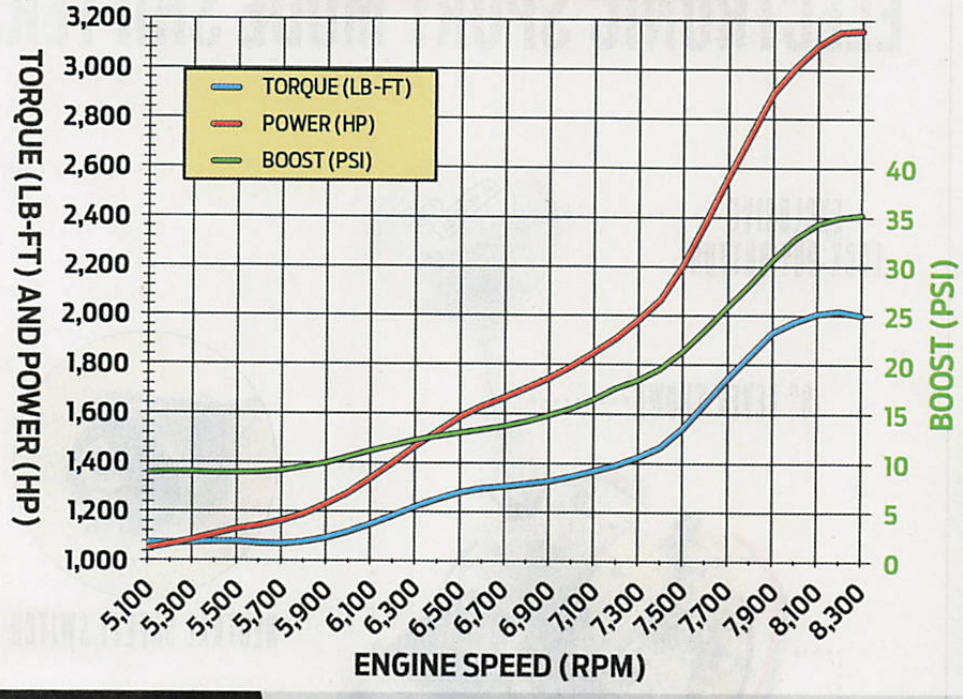
MoTeC's M150 ECU manages fuel, spark, timing, traction, the cooling fans (for both engine and differential), and boost levels using its fault-tolerant intelligent relays and race-grade sensors. Wheel-slip sensors modulate the amount of boost to prevent traction loss. A 5-bar MAP sensor reads through 58 psi of boost, but Duttweiler says that unlike his smaller-displacement small-blocks, the 557 big-block—thanks to all those cubes—doesn't need to run huge amounts of boost to get the job done (see "On the Dyno," below). Ignition timing at peak boost is 17 degrees; plug gap on the nonprojected-tip ice-cold racing spark plugs (Champion 55-range or Bosch equivalent) is just 0.012 inch.

Exiting the combustion chamber, the exhaust gasses travel through Steve Watt-built stainless steel headers with 2.25-inch primaries dumping into 3.5-inch collectors.

MSD

The MoTeC ECU drives two M&W Pro-Drag8 high-energy microprocessor 250 mJ CDI boxes that alternately juice eight MSD high-output coils, one for each cylinder.

ENGINE-DYNO RESULTS



ON THE DYNO

As of early April 2020, the big Rat motor is making more power than necessary to capture the AA/Blown Fuel Streamliner record: With a modest 35 psi of boost, the engine churns out 3,155.6 hp at only 8,300 rpm, with 1,826.5 average horsepower between 5,100 and 8,300 rpm, the definitive test's respective low and high points. Duttweiler says on a 557 engine, "14 to 15 pounds of boost is 1,600 hp, 17 pounds is just under 2,000 hp. It will do everything we need to do at 20 psi or 2,000 to 2,100 hp." That's easily enough to go 470 mph without abusing the engine under average track conditions.

Duttweiler explains, "Boost is what destroys motors, but this engine is reliable to 3,500-plus hp. If we did turn the boost up to 36 pounds—which is over 3,000 hp—we should run 480 to 490 mph, if the track (and traction) allows it. If we don't have the track conditions, we don't have the speed. Even under those best conditions, we can only use the full power potential for 7 to 8 seconds at a time during the just over one minute, 5-mile run down the Salt Flats."

The 2,017-lb-ft torque peak occurs at 8,100 rpm, just 100 hp lower than the power peak. Average torque output is 1,388.4 lb-ft between 5,100 and 8,300 rpm. (Yes, torque has only just begun to rise big-time when it passes the standard internal combustion engine's 5,252 rpm torque/power crossover point.) This might seem downright unnatural compared to the engines most of us routinely deal with, but Duttweiler must electronically rein in low-end torque via drivetrain management. The engine really isn't fully unleashed until it gets over 7,000 rpm in high gear. "We can't have too much torque too early in the run, or it will never get traction."

Fuel pressure starts out at a 70-psi baseline. "We add an additional pound of fuel pressure for each pound of boost." Oil pressure never falls below 92.7 psi.

DUTTWEILER LSR TWIN-TURBO BIG-BLOCK CHEVY

All dimensions in linear inches or fractions thereof unless stated otherwise.

Engine family	GM Mark IV big V8
Cylinder block	Dart Big M iron
Cylinder Heads	Dart PRO1 20° CNC
Displacement	556.5 ci
Bore x stroke	4.565 x 4.25
Fuel	Methanol
Fuel Mileage	0.4 mpg
Peak boost @ rpm	35.23 psi @ 8,300
Peak boost ignition timing	17°
Spark plug gap	0.012
Peak torque @ rpm	2,017.0 lb-ft @ 8,200
Peak power @ rpm	3,155.6 hp @ 8,300
HP/CI	5.67:1
Connecting rod center-to-center	6.400
Rod/stroke ratio	1.51:1
Piston compression height	1.260
Head gasket bore diameter	4.570
Head gasket thickness	0.060 compressed
Block deck height	9.801
Piston deck height	0.016 below deck
Piston volume	–29cc dish
Cylinder head chamber	86 cc
Static compression ratio	9.42:1
Main bearing clearance	0.0031–0.0035
Rod bearing clearance	0.0025–0.0035
Crankshaft thrust clearance	0.008
Rod side clearance	0.020
Cylinder-wall finish (RVK)	50
Piston-to-wall	0.008
Piston ring end gap	0.031 1st / 0.028 2nd
Piston-to-pin (floating pin)	0.0012
Piston-to-valve	More than 0.200
Cam bearing clearance	0.005
Cam specs	*See separate table*
Intake runner volume	451 cc
Valve angle	20°
Valve sizes (int./exh.)	2.40/1.800
Spring seat pressure	300 lbs @ 2.100
ARP main stud nut ½*	120 lb-ft
Auto Verdi rod ARP capscrew 7/16*	0.006 stretch or 90 lb-ft
ARP head stud nut 7/16*	100 lb-ft
ARP valley head stud nut 3/8 x 7/16*	65 lb-ft

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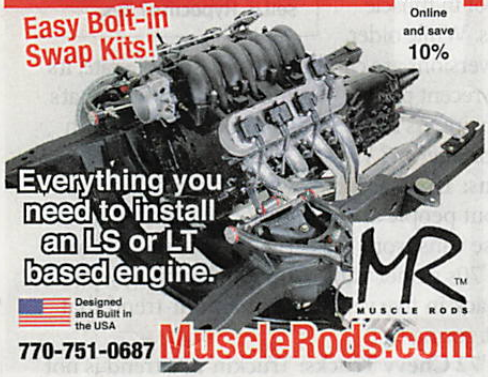

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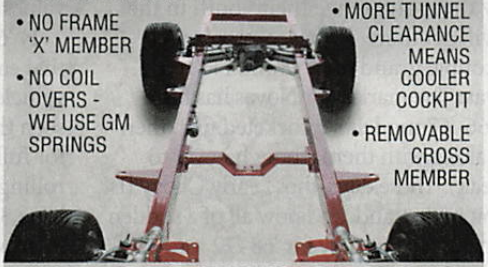

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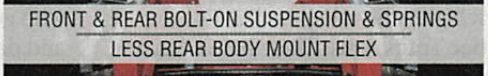

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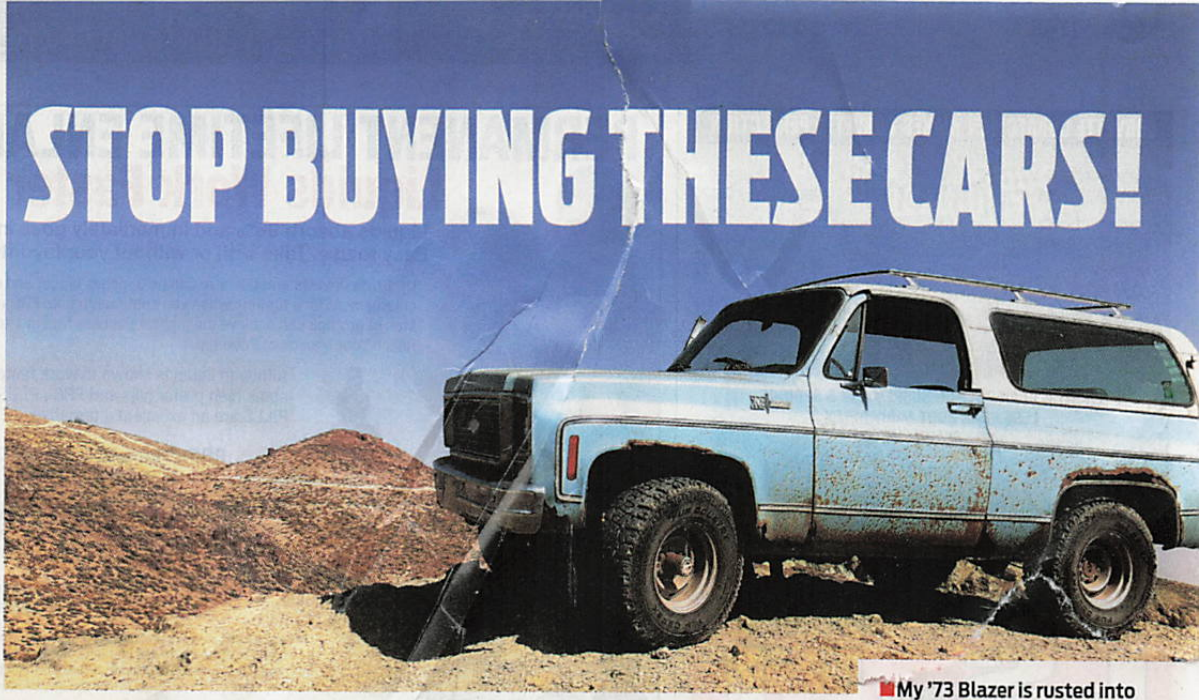

My '73 Blazer is rusted into the ground, but it's a full-top model with a stick! So I'll try and gouge someone when I sell it. Hypocrite? Yes.

By David Freiburger

Roadkill
@davidfreiburger

Too many cars are overpriced, and I'm here to do something about it. I've picked my top ten most ridiculously overvalued old vehicles, and if we stop buying them for six months to a year, demand will evaporate and prices will plummet. Are you with me?

The auctions and general demand for older muscle cars have inflated the value of everything American made, rear-wheel drive, and more than 40 years old. You know what I mean: every schmoe with a '73 Pontiac Catalina four-door says "I know what I've got," and expects $5,000 for it because "it has the Trans Am engine." Right? But that's not what I'm addressing here. This is a list of ten year/make/model categories that are fetching top dollars, and that, IMO, have far exceeded their value. Here they are, from least offensive to most.

10) Datsun 510s: You may be surprised to see a Japanese car on the list, but I've included them just so I can say that I think it's cool that classic import cars have been on a surge. The Datsun 240Z and its offspring have been inflating in interest and value for decades, but my mind is blown by today's prices on 510s because those were the hand-me-downs and throw-away mom cars of my youth. To see them go for $25,000 is stunning. It's driving up the prices on virtually all the pre-'80ish imports.

9) Fox Mustangs: These are low on the list because I don't think the prices for good Fox Mustangs has yet radically exceeded the price range of the guys who want to buy them and relive their youth in the '80s—but they will get there. I used to pick up 5.0 Mustangs for a couple grand on a whim. No more.

8) '68-'72 Novas: The market for Novas has been interesting. The '66-'67 models skyrocketed first, then dragged '62-'65s along with them (though never to quite the same peak). These days, those early Chevy IIs have dropped a bit in demand, and now all of a sudden people want Camaro-type money for '68-'72 models. Those cars are driving up the values on '73-'74s.

7) '77-'81 Pontiac Trans Ams: These have been on the plot for 25 years-plus. If I'm honest, they are stable and mainstream, but I'd rather gripe about smog-era cars with the doors falling off that are demanding annual-salary kind of money.

6) '69-'70 Mach 1s: Like the Trans Ams, the original Mach 1s have long held a high spot in muscle car values. While older, restored versions are climbing at a reasonable rate, it's the more recent pricing of gutted rolling bodies that's drawn my ire. As in, $25,000 for rolling bodies with no glass or interior? Wow.

5) Vans: These are the lowest-priced vehicles on my list, but people are asking $7,500-plus for short-wheelbase vans from the early flat-face models to the later '70s stoner vans. Good luck getting your money back in five years. This is a mini-trend that that's not gonna last.

4) '67-'72 Chevy Trucks: Truckin' as a trend is not news, and the shortbeds have been hot merch for an eon. But all of a sudden the prices for ¾-ton longbeds is on the rise—and the more clapped out they are, the more they are worth. It's the attack of "patina." If your truck has a utility bed, even better! Lay frame and sell it for $35k!

3) Squarebodies: See above. The only thing worse than the price of an earlier Harry Bentley Bradley designed C10 is the asking price for a '73-'87 square-body Chevy/GMC pickup. I think these have had the steepest curve from $1,500 to $15,000 of any vehicle on this list.

2) '68-'70 Dodge Chargers: The second-generation Charger is today's 'Cuda. Everyone wants one. I've shopped for them on and off for a decade, and today's values for clapped-out garbage is just obscene.

1) '66-'77 Ford Broncos: I have no qualms saying that early Broncos are the most overpriced collector vehicles on Earth. Thirty years ago, who could have seen these being priced at $100,000 and beyond for full custom versions? And at $25,000 for rusted rolling chassis? Even beat-up former rockcrawlers have $35,000 asks. Somehow the Bronco managed to cross over from 4x4 trail guys and into people who got tired of overspending on one-off '32 Fords and decided to ruin the Bronco marketplace instead. Come to your senses, folks.

If you don't believe me that your actions can bring the marketplace back to reality, just note the value drop over the past decade for street rods and Corvettes. We can do this together…separately.

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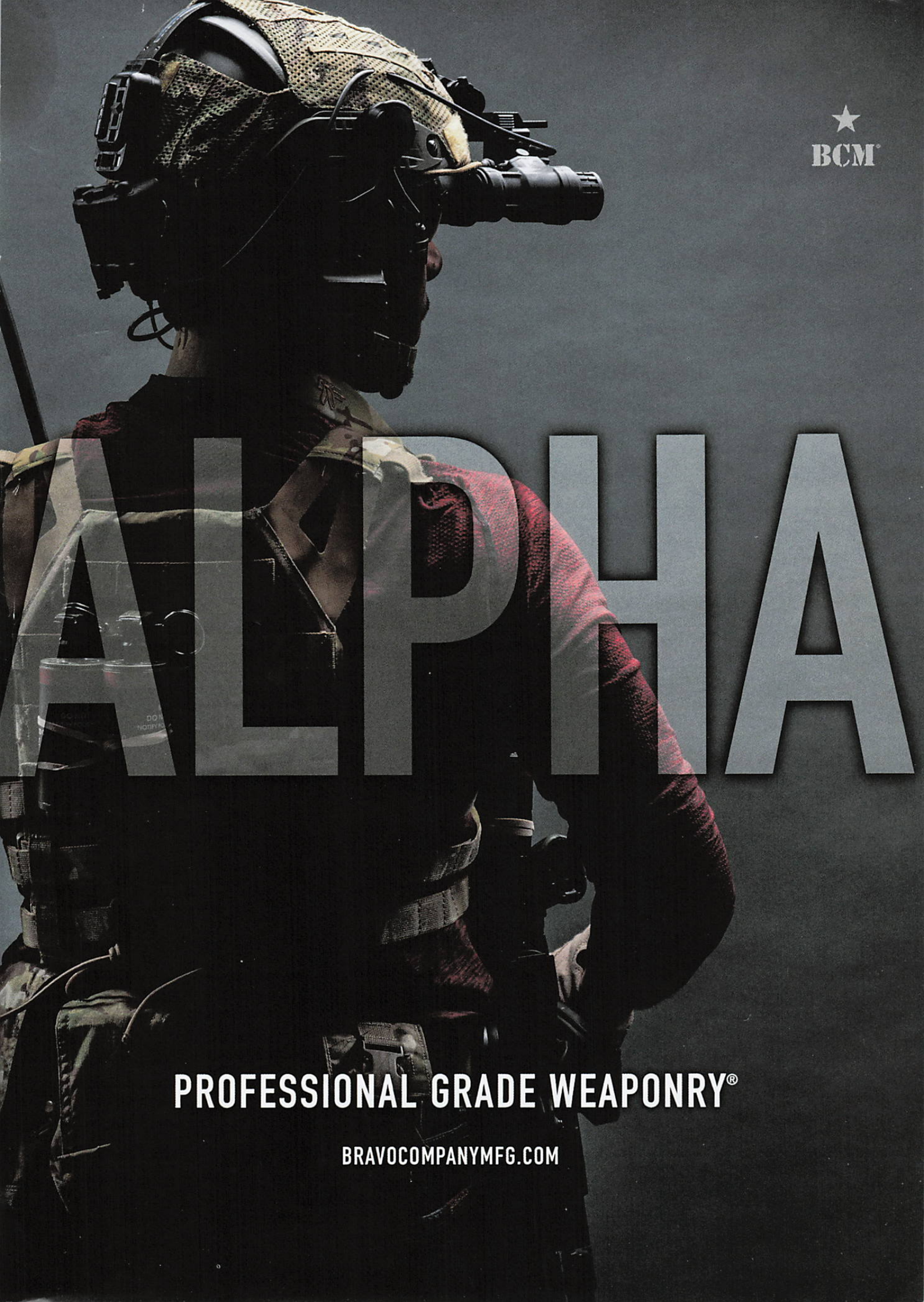
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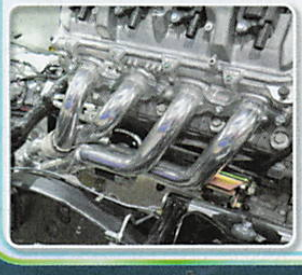

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